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ARISTOTLE
HISTORY OF ANIMALS
BOOKS 7–10



Edited and Translated by
D. M. BALME

In *History of Animals* Aristotle analyzes "differences"—in parts, activities, modes of life, and character—across the animal kingdom, in preparation for establishing their causes, which are the concern of his other zoological works. Over 500 species of animals are considered: shellfish, insects, birds, fish, reptiles, amphibians, and mammals—including human beings.

In Books I–IV Aristotle gives a comparative survey of internal and external body parts, including tissues and fluids, and of sense faculties and voice. Books V–VI study reproductive methods, breeding habits, and embryogenesis as well as some secondary sex differences. In Books VII–IX, Aristotle examines differences among animals in feeding; in habitat, hibernation, migration; in enmities and sociability; in disposition (including differences related to gender) and intelligence. Here too he describes the human reproductive system, conception, pregnancy, and obstetrics. Book X establishes the female's contribution to generation.

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D. M. Balme was, at the time of his death, Professor Emeritus of Classics, Queen Mary College, London; his edition of Books VII–X has been prepared for publication by Allan Gotthelf.

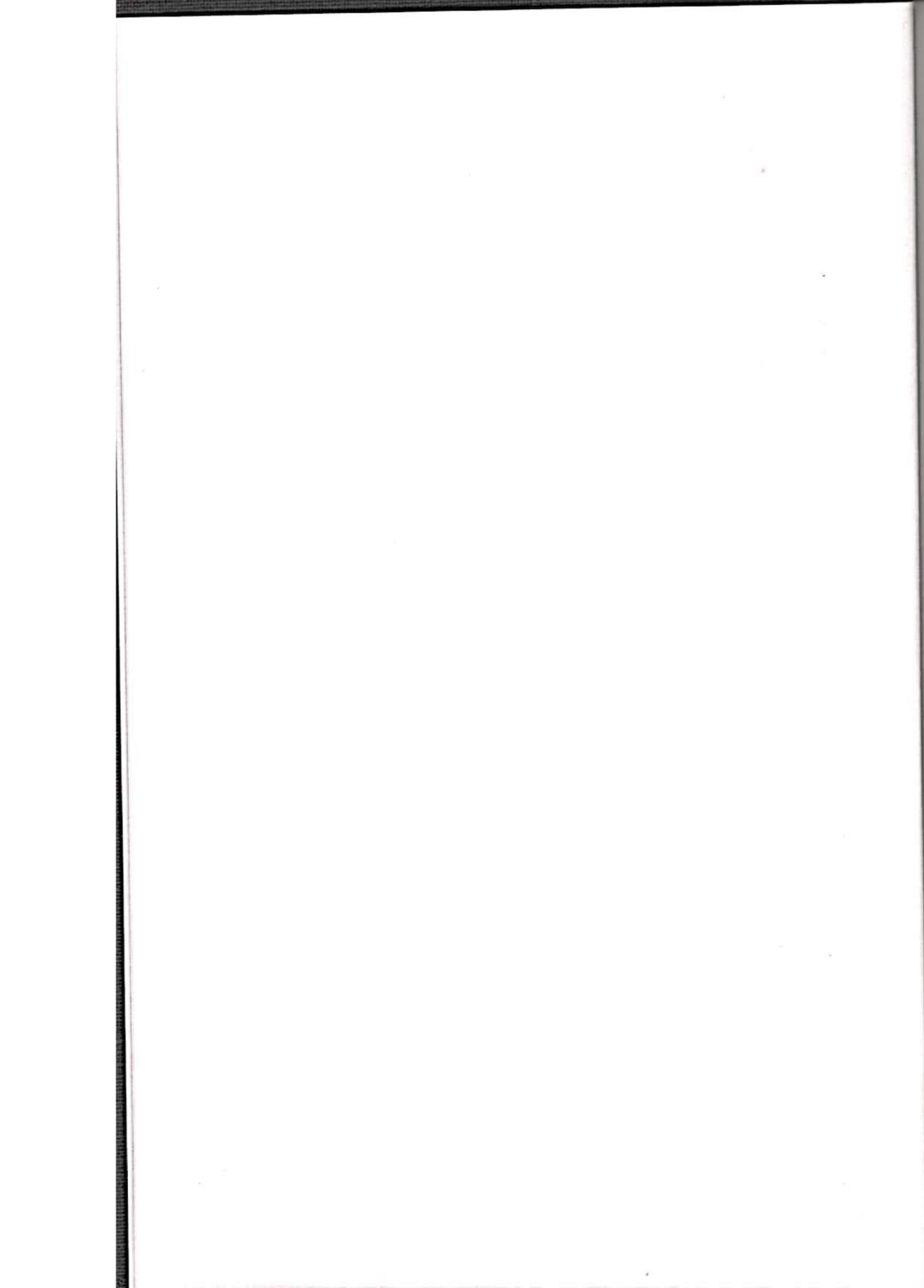
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Aristotle's biological corpus includes not only *History of Animals*, but also *Parts of Animals*, *Movement of Animals*, *Progression of Animals*, *Generation of Animals*, and significant parts of *On the Soul* and *Parva Naturalia*. Aristotle's general methodology—"first we must grasp the differences, then try to discover the causes" (HA 1.6)—is applied to the study of plants by his younger co-worker and heir to his school, Theophrastus: *Enquiry into Plants* studies differences across the plant kingdom, while *De Causis Plantarum* studies their causes. In the later ancient world, both Pliny's *Natural History* and Aelian's *On the Characteristics of Animals* draw significantly on Aristotle's biological work. The only work by a classical author at all comparable to Aristotle's treatises on animals is Xenophon's *On Horses* (included in Volume VII of the Loeb edition of Xenophon).

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ARISTOTLE
HISTORY OF ANIMALS
BOOKS VII-X

EDITED AND TRANSLATED BY

D. M. BALME

PREPARED FOR PUBLICATION BY

~~ALLAN GOTTHELF~~



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PREFACE

Arthur Peck died before he could complete his edition of the *Historia Animalium*, and I am honoured to have been invited to take his place. He left only a draft translation of book VII(VIII) with some notes, which I have gratefully consulted and quoted where appropriate. But the nature of the last four books of *HA* has necessitated a change of approach in this volume. Peck had found it satisfactory to base books I–VI upon Dittmeyer's Teubner text of 1907; in VII–X, however, both Dittmeyer and other editors who have regarded these books as spurious and very corrupt have permitted themselves such numerous and audacious conjectures that there seems no safe course but to return to the MSS. I have therefore collated afresh all known MSS of books VII–X and have based the text strictly upon them, confining conjectures to the notes. The result is in fact not unlike Bekker's Prussian Academy text of 1831, but it is often more difficult. To mediate it to the reader, I have kept the English version closer to the Greek; inevitably it is less expansive and less felicitous than Peck's delightful and inimitable manner; explanations of the most difficult passages are suggested in the notes. Although book X is

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generally recognised to have formed no part of the original *HA*, for which reason Peck expected to omit it, I have now thought it advisable to include it here for the same reasons that moved Schneider to add it at the last moment to his edition of 1811, namely that it has its own importance and interest, and that this is where a reader would naturally look for it.

I am grateful for wise advice and kind help in many ways from R. Walzer, H. Cherniss, H. J. Drossaert Lulofs, P. Moraux and the Aristoteles-Archiv in Berlin, G. E. Newell, and A. Gotthelf; I am very grateful too to the Institute for Advanced Study at Princeton where I spent a fruitful year, and to my colleagues at Queen Mary College London who by generously giving their time made it possible for me to be absent.

D.M.B.

David Balme died in 1989 before completing the revision and abbreviation of his 1984 typescript occasioned by his subsequent work on an *editio maior* of the whole of *Historia Animalium*. In preparing the present volume for publication, I have tried to stay as close as possible to his intentions. The text and translation remain essentially as he left it; I have excluded a few revisions of the text which were not entirely clear in his notes, have corrected typographical and reporting errors, and, working with Philippa Gould, have modified the translation in some places where the rendering was

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unintentionally ambiguous or awkward or where subsequent revision of the text had not been taken into account; these are the only changes. The Introduction, critical apparatus, and notes have been reduced to bring the volume in line with standard Loeb practice; bracketed notes which I have added to the Introduction explain some of these reductions and indicate where Balme's 1988 revision ended. (For a fuller description of the differences between the 1984 typescript and the present volume, see "A Note on the Loeb *Historia Animalium* vol. III", *Ancient Philosophy* XI [1991].) I have supplied an index to all three volumes of *HA*.

In accordance with Balme's plan for his *editio maior*, the manuscript order of the books, rather than the traditional modern order, has been followed in this volume. In references the restored book number is given first followed by the more familiar number in parentheses. The order of the books in this volume is thus: VII(VIII), VIII(IX), IX(VII), X. (For the history of the modern reordering, and the evidence, see p. 18 f below.)

David Balme reports in his introduction that "The Aldine *editio princeps* of 1497 is the only text of *HA* that has ever been based primarily upon the Greek MSS." As a result of his work, that statement is no longer true. We can only regret that he did not live to complete his *editio maior*, but we can be grateful that we have as much of it as we do.

A.G.

INTRODUCTION

Authenticity and Date of HA VII-X

The last four books of *HA* have provoked more doubts about their authorship than books I–VI (see Vol. I, *Introd.* p. liii). Although certain sections in the earlier books have been questioned (e.g. the accounts of the apes and of the chameleon in II), there is felt to be a general unity of subject and of treatment which binds these books together, so that those who doubt parts of VII–X have mostly defended I–VI, and some have even regarded them as the only authentic *HA*. But the question is whether this general coherence really embraces the later books too. It is a useful question because it reflects upon the nature and purpose of *HA*. For if Aristotle intended the treatise merely to collect information, it could well have remained open to indefinite supplementation by his successors. But if it had an analytical purpose as well, it should exhibit a structure by which one should be able to judge the relevance and integrity of its contents. In either case a work of this sort, consisting of factual statements linked by only a thin thread of argu-

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ment, would easily conceal interpolations and dislocations. But while it is possible to fault particular statements and even paragraphs, it must remain a long step to conclude from such particulars to a general condemnation of entire books, if the books really are a necessary part of a planned whole. This is therefore the first question to be settled. But it should be said at once that there is going to be no rigorously provable answer; it is a matter in which probabilities have to be weighed.

In the following pages I try to set out the case for authenticity on the general grounds that the case against it is too weak and takes insufficient account of the significance of *HA* in Aristotle's philosophy. I also offer reasons for thinking that books I–IX were written by Aristotle not before but after his other biological treatises, while book X (which is now generally agreed to be no part of *HA*) can nevertheless be defended as an earlier work of Aristotle. The evident insertions and minor contradictions within I–IX, which have been held up as evidence of spuriousness, should in this view be seen as the stratification of a work which was being built up over several years as new information came in. But it is unavoidable that subjective judgement enters into this debate. From my own experience I would only warn the reader who comes fresh to Aristotle's biology after reading his metaphysics and ethics, that he may feel—as well as the distaste against which Aristotle himself warned us in *PA* I 5—also a

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lowering of the temperature, a loss of intensity, which it is tempting to ascribe to a lack of intellectual quality in the work; this temptation may be followed by a desire to attribute it all to Theophrastus. But if he will persevere, he will find that this mass of small data, which in such a subject cannot be dispensed with, is marshalled with shrewdness, economy, structure; occasionally there is a sharpness and speed of argument which surely bears Aristotle's mark. He will recognise other qualities characteristic of Aristotle's philosophising—the refusal to speculate beyond the evidence, the exact use of words, the minute analysis of argument. He may also agree that the *HA* has a primarily analytical purpose and was never intended to be a natural history in our sense.

The grounds for condemning books VII–X can be summarised as: inconsistencies of fact and doctrine, variations of style and vocabulary, and apparent incompetence in disorderliness, irrelevance, acceptance of absurdities; all these charges are made by the critics quoted in Vol. I, p. liii ff, leading to the view that these books were later compilations including work taken from Theophrastus, Eudemus, Strato and other Peripatetics (see for example O. Regenbogen, article "Theophrastos" in Pauly-Wissowa's *Real-Encyclopaedie*, 1950).

The external evidence is far from conclusive. The two ancient catalogues include in the one case (Diogenes Laertius and the Anonymus Menagii) a

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work "on animals" in 9 books and a separate work "on failure to generate" in one book; in the other case (Ptolemy and the Appendix Hesychiana) a work "on animals" in 10 books. It is now generally accepted that the former catalogue originated in the 3rd century B.C. Peripatos, and that the title "on failure to generate" indicates *HA* X, which would then not have been part of *HA*¹; the second catalogue was made after Andronicus had edited the corpus in the 1st century B.C., when he presumably added this separate work to *HA* as its tenth book. *HA* X will therefore be discussed separately below. Aristotle's other biological works contain 24 explicit references to the "historia",² of which 18 point to identifiable passages in books I–VI and the remainder to more general contents which do not exclude VII–IX. Theophrastus *CP* II 17. 9 refers to "the historiae", quoting details which are found in *HA* V, VI and VIII(IX). Quotations from "Aristotle on animals" begin to appear in extant literature from the 3rd century B.C., the earliest being in Antigonos of Carystus, who quotes identifiably from each of books I–IX. But both Antigonos and all classical authors, Greek and Latin, who quote "Aristotle on animals" attribute to it many statements that are not found either in Aristotle or elsewhere. For instance, Athenaeus IX 394 quotes "Aristotle's fifth

¹ P. Moraux, *Les listes anciennes des ouvrages d'Aristote*, Louvain 1951, 107.

² Bonitz, *Index Arist.* 103a43–55.

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book on the parts of animals" as containing statements some of which occur in *HA* V while others (concerning pigeons' colours) are not found in Aristotle nor anywhere; then Athenaeus adds some statements which occur in *HA* V, VI, VII(VIII), VIII(IX); and then he says "In the same book Aristotle says ..." quoting *HA* V again. It seems that Athenaeus was unaware that some of these statements had been gathered from different parts of *HA* while others are not there at all. The probability is therefore that he was drawing not directly from *HA* but from an intermediate source. The same appears to be true of Aristophanes of Byzantium, Pliny, Plutarch, Aelian, Eustathius. It follows that we cannot draw sure conclusions from these quotations, either about Aristotle's zoology or about Theophrastus. Sometimes a quotation is referred to "the animal books" (τὰ ζῳικά) rather than "on animals" (περὶ ζώων), which raises the question whether the former existed separately as a compendium or whether it was merely a way of referring to the biological treatises generally. It certainly seems that some kind of handbook—possibly more than one—existed already in the 3rd century B.C., and that readers used it rather than the original treatises, either because the latter were not available or because they were too difficult to use, as well they might seem.

This matter is uncertain and calls for further research. Meanwhile it has given rise to various

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hypotheses, which have been accepted perhaps too readily. One is the hypothesis, suggested by V. Rose and repeated by O. Regenbogen, that at Theophrastus' death in 287 the works of Aristotle and Theophrastus were unseparated.³ There is virtually no factual basis for this except that Antigonus attributes to Aristotle some statements which are not found in Aristotle but resemble statements which have been conjecturally attributed to lost works of Theophrastus, his supposed 'fragments'. Against this, Heitz, Susemihl and Kroll have all argued that a likelier solution is that Antigonus' source was a compendium of Peripatetic writings about animals.⁴

The hypothesis, suggested by I. Düring⁵ and accepted by several, that the authentic *HA* consisted of books I–VI only, was based on the fact that most of Athenaeus' identifiable quotations come from *HA* V (which goes closely with VI) and that he calls it "the work on the parts of animals"; Düring even sug-

³ V. Rose, *Arist. Pseudepigraphus* 1863, 279; O. Regenbogen, *RE* "Theophrastos" 1370, 1430.

⁴ E. Heitz, *Die verlorenen Schr. d. Arist.*, 1865, 228; F. Susemihl, review of Rose *Arist. Fragmenta* (Teubner 1886) in *Wochenschr. f. klass. Philol.* 44 (1887) 1356; W. Kroll, "Zur Gesch. d. arist. Zoologie", *Akad. d. Wiss. Wien* 1940, 5.

⁵ I. Düring, "Notes on the Hist. of the Transmission of Arist.'s Writings", *Göteborgs Högskolas Årsskrift* 56 (1950) 48; O. Regenbogen, "Bemerkungen zur H.A. des Arist.", *Stud. Ital. di fil. class.* 1956, 444.

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gested that the first 3½ books of *HA* were a preliminary draft of *PA*. But as J. J. Keaney has pointed out,⁶ the title "on parts of animals" is twice used to refer to *HA* VIII(IX) in an *Oxyrhynchus* papyrus contemporary with Athenaeus. It would be a conventional way of referring to *HA* since these are among its opening words.⁷ Moreover, if the title were meant to indicate contents, V and VI would not be included, for they are not about parts but about generation, which is one area of "activity and life" according to VII(VIII) 588b23-32, 589a2, 596b21.

VII(VIII) 1 was attributed to Theophrastus by F. Dirlmeier⁸ on the grounds (i) that it contradicts both *HA* I and other treatises when it credits animals with memory (*μνημή*, 589a1) without denying them recollection, and also allows them thought (*διάνοια*, 588a23); (ii) that it presents the *scala naturae* as an historical development; (iii) that the idea of each animal pursuing its natural pleasure (589a8) is the Theophrastan theory of *Oikeiosis*. But this evidence is hardly substantial. For what *HA* I says (488b25), in agreement with *Mem.* 453a6, is that animals have memory but lack the ability to recall to mind, because the latter is a form of reason-

⁶ J. J. Keaney, "Two Notes on the tradition of Arist.'s writings", *Amer. Journ. Philol.* 84 (1963) 53; *P.Oxy.* XV.1802.

⁷ E. Nachmanson, *Der griech. Buchtitel*, 1969, 50.

⁸ F. Dirlmeier, *Die Oikeiosis-Lehre Theophrasts*, *Philolog. Suppl.* XXX (1937) 56.

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ing which requires intellect (nous). VII(VIII) 1 omits this distinction but does not credit animals with either recollection or intellect, but only with memory and with "resemblances" of dianoia, synesis, phronesis, all of which are credited to animals in *PA*, *GA* and other books of *HA* without even the reservation that they are mere resemblances. VIII(IX) 610b22 credits animals even with nous and lack-of-nous, but obviously without implying more than that they can be more or less intelligent in their behaviour, as it then illustrates with examples; there is no suggestion in VII(VIII) or VIII(IX) of intellect in the technical sense of *De Anima* and *GA*. The description of the scala naturae in VII(VIII) (588b4) is not historical but clearly analytical; it exactly matches that in *PA*—in fact they are doublets. The idea that each animal develops the nature proper to it is basic in Aristotle's zoology (for each actualises its inherited potential form), and needs no special theory of Oikeiosis to account for it here; and the related idea that each animal seeks the food and environment akin to its nature is presented in *Resp.* (cf. 477b23 ff). Nor are there substantial grounds for attributing later sections of VII(VIII) to Theophrastus, as was suggested by Dittmeyer and Regenbogen of the sections on hibernation (599a5) and venomous animals (607a21) and the reports of colour changes, matters also dealt with by Theophrastus. If there was any borrowing, there is no

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reason why Aristotle should have taken passages from Theophrastus rather than the other way about. It is more likely that Theophrastus' lost works on these subjects were discussions of particular points arising from Aristotle's account, in the manner of his extant metaphysical fragment.

In VIII(IX) Dittmeyer points to some 20 inconsistencies of fact between VIII(IX) and other books of *HA*, and a number within VIII(IX) itself. Both he and Joachim⁹ also argue that the vocabulary of VIII(IX) is unusual. But it must be said that these objections are hypercritical. Half of the alleged inconsistencies do not directly conflict, and those that do conflict are all trivial. There are similar inconsistencies within the other books over breeding seasons, longevity, and other minor factual details from which no theoretical inferences are drawn. It is probable that these betray separate reports and a lack of final revision. Other treatises of Aristotle contain far graver inconsistencies than these. Most others also contain their own lexical peculiarities and preferences, beyond those due to subject matter. There is no reason to single out *HA* VIII(IX) in this regard. Undoubtedly it shows variations of style (e.g. 608b19), but so do other books of *HA* and other treatises (cf. *HA* IV 533b10, V 542a20, VI 571b3,

⁹ L. Dittmeyer, "Die Unechtheit des IX Buches d. arist. Tier-Geschichte", *Blätter f. d. bayerische Gymn.* XXIII (1887); H. Joachim, *De Theophrasti libris peri zōōn*, 1892.

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and the abrupt changes at *PA* I 642a31, 644b22). The relevant consideration is whether these stylistic variations fall within a recognisable and characteristic Aristotelianism. Here subjective judgements arise, for, as I explain below, there is little scope for stylometric analysis in *HA*. I can only say that, by my judgement, this all reads like Aristotle; furthermore, if Theophrastus wrote *HA* VII(VIII) or VIII(IX), then we must look for another author for *Hist. Plant.* and *Caus. Plant.*

The alleged debt of book IX(VII) to the Hippocratics, suggested by E. Littré and others,¹⁰ would not in itself be a ground of condemnation unless IX(VII) conflicted with Aristotle's known views; and this is not so. But in fact the debt is to be doubted. If one checks IX(VII) against the Hippocratic treatises, including all the passages cited by Kühlewein, Poschenrieder and Dittmeyer in support of Littré, it is difficult to see either theoretical or verbal parallels. There are three possible comparisons in IX(VII), amounting to 9 Bekker lines in all: 583b11, miscarriages are called ἐκρύσεις up to 7 days and ἐκτρωσμοί thereafter up to 40 days; 586b4, birth is normally head first; 587b5, newborn babies when

¹⁰ E. Littré, *Oeuvres d'Hippocrate* VIII (1853) 4; H. Kühlewein, *Philologus* 42 (1884) 127; F. Poschenrieder, "Die naturwiss. Schr. d. Arist. in Verh. z. d. Hippokr. Sammlung", *Progr. Bamberg* 1887, 34; L. Dittmeyer, ed. of *HA* (1907) vii; D. W. Thompson in *Oxf. trs. of HA*, notes to bk. VII.

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awake do not laugh nor cry nor respond much to tickling. But these are mere commonplaces. In the rest of *HA* excluding book X there are 15 other parallels, totalling 18 lines, mostly describing parts of the body and all again commonplaces. On the other hand IX(VII) contains four passages conflicting with Hippocratic statements on more technical matters: on the occurrence of menstruation after conception, the rates of development of embryos, and the viability of 8-month births (see notes at 583a26, 583b4, 14, 584a36). H. Häser concluded that Littré's suggestion was too hasty (*Gesch. d. Medizin*, 1875, I. 127). C. Fredrich argued further that Aristotle did not even know the Hippocratic treatises that we have.¹¹ Certainly it is doubtful whether there is any significant Hippocratic influence in *HA*; on the other hand Aristotle's statements often conflict with known Hippocratic views.

Much of *HA*, and especially the later books, has been accused of credulousness unworthy of Aristotle. In modern times Aubert and Wimmer, followed by Dittmeyer, have emphasised this, but the ancient criticism was even more severe, for example the well-known pages of ignorant sarcasm in Athenaeus (VIII 352D): "From what Proteus or Nereus rising from the deep did Aristotle learn what fishes do, or how they go to bed or spend the day? ..." But as

¹¹ C. Fredrich, *Hippokratische Untersuchungen*, Berlin 1899, 78.

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natural history has advanced, most rapidly in this century through the camera, Aristotle's surprising reports have been more and more vindicated, and shown to be serious, well-founded and important observations. It is now possible to see how cautious and critical he is, especially when compared with Herodotus or Ctesias. This has altered our perception of *HA* VIII(IX) in particular, which can no longer be viewed as a collection of marvels intended to instruct or amuse, but as what it claims to be—a study of animal "character", that is behaviour and intelligence. Its emphasis is not on what is extraordinary but on what distinguishes one animal's character from that of other kinds. The oddities are greatly outnumbered by ordinary details, both in VIII(IX) and in the other books, and it is precisely this painstaking examination of everyday attributes and behaviour that made *HA* a revolutionary work. The only ancient work of comparable quality is that on horses by Xenophon, whose range is tiny compared with Aristotle's.

Similarly the criticism of disorderliness has arisen from a misconception of the work's intention. This will be discussed below, where it will be argued that the *HA*, if regarded not as primarily a natural history but as a study of animal differentiae, is broadly unified and coherent. Barring some minor dislocations, its contents are relevant and in the right places. But it evidently draws upon reports from different sources, which have not been finally

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harmonised. It is stratified, some reports appearing to be later than others. Seen in this light, criticisms of incompetence, of unintelligent insertions and compilation, lose their force.

Book X, however, is a different matter. Its subject is not the differences between animals (which is the declared subject of *HA*, 491a9) but the causes of generation by male and female. All critics now agree that it is not part of *HA*, but was probably the book listed in the older catalogue as "On failure to generate". But many have taken the view that the book is not even by Aristotle. That may be so; but there is a case for book X, which will be discussed separately below.

The Plan of *HA*

The purpose stated at I 491a9 is "to take the differentiae and attributes of all animals (*διαφοραί, συμβεβηκότα*)". These are technical expressions from logical division, diaeresis, which Aristotle discusses in the *Analytics*, in *Metaphys.* Z 12, and in *PA* I 2-4. According to his method, which differs radically from Plato's, a diaeresis divides a general kind (*γένος*) into its various forms (*εἶδη*) by particularising the differentiae which are proper to that kind. For instance, birds are a kind, marked off from other kinds by being two-footed, feathered, flying, etc.; the bird *genos* is an autonomous group which is recognised intuitively (by popular consent, *PA* I 644b2). Within it each bird form is dis-

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tinguished by variations among the generic differentiae, e.g. by longer or shorter legs or feathers, etc. When thinking of definition, in his logical discussions, Aristotle distinguishes between differentiae and attributes, and further divides the latter into proper and accidental (*καθ' αὐτά, μὴ καθ' αὐτά*). So in the case of a triangle, which is a form of the *genos* 'plane figure', its defining differentia is three-sided, a proper attribute is that its interior angles add up to two right angles, and an accidental attribute might be that it is made of bronze. These distinctions are occasionally suggested in *PA* and *GA*, but they do not dominate the analysis there, which is more directly determined by causal explanations; in fact it is often difficult to draw a line between defining and non-defining characteristics in those treatises. In *HA* the line disappears altogether, and no use is made of distinctions between differentiae and attributes nor between proper and accidental; all characteristics are examined on the same footing and are called differentiae or attributes indifferently — if there is a difference it exists only in their basic sense ('differentia' indicating that this animal's feature is dissimilar to that animal's, 'attribute' indicating that this feature is possessed by this animal) but not in their full technical sense. The reason is presumably that the technical distinctions have meaning only in relation to the defining of whole objects, whereas *HA* does not study animals as wholes but only their separate

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characteristics. Its arrangement makes this clear. For the differentiae are divided into categories such as bodily parts, breeding, nutrition, so that the characteristics of a given animal are distributed to various sections. These characteristics, moreover, are selective. For instance, in the blind mole-rat (aspalax), which is an important case for Aristotle (cf. *de An.* III 425a10, *Metaph.* Δ 1022b26) and is twice described from actual dissection, the only data reported are a description of the concealed eyes and the fact that it is viviparous: clearly the aim is not to provide a natural history of the mole but to exhibit its significant difference from other animals—its combination of sightlessness and viviparousness. The aim stated at 491a9 was “the attributes of all animals”, not all the attributes of each animal. Significant differences are examined at every taxonomic level from the most general grouping blooded/bloodless down to local varieties of a form like the Syrian sheep (VII(VIII) 606a13). As he explains at *PA* I 644a23, general features should be examined at the general level at which they are common, specific features at specific level; in *HA* he takes this procedure down to individual differences caused by climate or disease.

The examination of differentiae therefore necessitates a grouping of animals, and this problem is discussed at I 490b7, II 505b26, IV 523b1, VII(VIII) 589a10. Here he emphasises the difficulty of arranging groups so as not to overlap, and the lack

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of intermediate sub-groups. The result, if regarded as an attempt at classification of animals, is inadequate and even incoherent; but if regarded as what he says it is—a means to the analysis of differentiae—it well serves the method which he lays down at the beginning of *HA*. For in comparing differentiae he draws the fundamental distinction between analogues (features which serve similar functions, like feather and scale) and features which are basically the same but differ by “the more-and-less” (long feathers, short feathers): as between one genos and another the comparison is analogical, but between the forms within a genos the comparison is “more-and-less”. Genos and form are therefore relative terms: genos indicates a group, which may be taken at any level of generalisation, which is autonomous for the purpose of discussion,¹² e.g. the genos of viviparous quadrupeds or the genos of Laconian hounds; eidos is a form of animal contained by the genos and distinct from other forms of the genos. The word genos points to kinship, groupability; eidos points to the formal aspect of an object, definability. Their significance is not classificatory but analytical, and the *HA* is not devoted to natural history nor to accounts of animals for the sake of such accounts, but to an investigation into the ways in which animals differ, and to the collecting and comparing of these differ-

¹² P. Pellegrin, *La classification des animaux chez Aristote*, Paris 1982 (rev. English ed., Berkeley 1986).

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ences. (On the significance for this issue of the chapter divisions in *HA*, see p. 30 f.)

Such an investigation is necessitated by the reformed method of diaeresis explained in *PA* I 642b5–644b21, where Aristotle lays down that, rather than attempt a progressive dichotomous division taking one differentia at a time, a division should start by putting together all the differentiae belonging to a *genos*, and should then show how these differentiae are further particularised in each form. The close relation between this and *HA* is evident at the beginning of *HA* I, which introduces the whole treatise by explaining the comparison of differentiae in terms both theoretically and verbally similar to *PA* I. Then Aristotle says (487a11) that the differentiae are in respect of lives, activities, characters, parts. These categories are recalled in the introductions to books VII(VIII) and VIII(IX), but they are only approximate divisions and are not treated as mutually exclusive. Aristotle moves to them without saying in so many words that the distinctions between “analogy” and “more-and-less”, which he has initially demonstrated in the case of parts, also apply to the other categories, but in practice they are so applied throughout the treatise. He now (487a12) gives a “sketch” (*typos*) of these differences, before proceeding to detailed examination. This is a normal procedure of his whereby—like a painter who first blocks out with charcoal the main elements of his design—he sets out the

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general aspects or principles which will be found to be common to the details (cf. *de An.* II 413a9, *EN* I 1101a27, *Top.* I 101a18, *Pol.* VII 1335b5). Such generalities are neither formal postulates required to prove the details nor mere samples of what is to come, but something between: they are guidelines which express the real structure but are still universalised and await the more precise definition which is available only in particulars.

The rest of book I with II–IV deals with bodily parts, extended to include sense organs, voice, sleep, sex differences. V–IX deal with activities, lives, characters, but these are not strictly delimited. V and VI are occupied with generation and brood care, extended naturally to include sexual behaviour and nesting; all of this is stated in VII(VIII) to be a part of “activity and life”, but inevitably some of the data are also relevant to “characters” and are reported again in VIII(IX) where “character” is the focus of attention. IX(VII) concerns human generation; it is placed as book IX in all MSS before Gaza, but he removed it to its modern position in his Latin translation (c. 1458; see p. 49) on the grounds that the books on generation belong together. The introduction to V says that in regard to generation man will be considered last because it is the largest subject: while this might imply that IX(VII) should follow VI, the introductions to VII(VIII) and VIII(IX) do not suggest that man has already been discussed; moreover IX(VII) is evidently incomplete; so that

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the MSS order is probably correct, putting first the other animals' activities (not only generation) and then proceeding to man. VII(VIII) touches first on character differences, and then makes a detailed examination of habitat and nutrition; at 596b20 "activities" are widened to include provision against temperature extremes, i.e. migration, hibernation and aestivation; 601a23 shows that the connecting link is "good condition", and moves easily to consider the effects of seasons, localities, pests and diseases, pregnancy. While it is clear that reports from several different sources have been put together in VII(VIII), there is no doubt of the relevance of it all (except for a few small passages). VIII(IX) begins by recalling the introduction of VII(VIII) and then takes up the differences in character, i.e. in intelligence and psychology; it too is a collection of separate reports, not yet finalised but rather giving the impression of a file that Aristotle still kept open for further examples; its contribution to the plan of *HA*, however, is clear and coherent, and was necessary from the outset.

There are many internal references and links between the books. Book I refers to passages in III, VII(VIII) and VIII(IX); II refers back to I; III refers back to I and II and forward to V, VI and VIII(IX); all the others (except X) refer back to preceding books. One should not, however, place too much reliance on such references, which could readily have been inserted later. There is more weight in

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the consideration that *HA* I-IX is a unity formed by a rational plan, based on the theory of diaeresis in *PA* I, and that the sketch plan in *HA* I requires the general contents of books II-IX. Although it is always arguable that particular passages are adventitious, there is no probability of large-scale intrusion and still less of any wholly non-Aristotelian book.

What can be said, however, is that the plan was laid out before much of the treatise was written. For it mentions some differentiae which are not later dealt with,¹³ while some important new data are introduced as the work proceeds (e.g. the oviparous selachians, VI 565a22). Some later sections look unfinished, suggesting that they were kept open for additions. Others look like later insertions, either because they contain data which ought to have modified the contextual argument, or they show changes of style, or they include packets of information which ought to be distributed elsewhere (e.g. contrast the treatment of the crocodile with that of the apes in II: details of the crocodile, which are mainly owed to Herodotus, have been distributed to appropriate sections, while the section on the apes is a complete description containing details that not only belong elsewhere but should

¹³ E.g. 488a25 "burrowing", 488b2 "field-dwelling", and several of the character differentiae in 488b12-24 such as ἐνστατικά, ἀμαθῆ, ἀνελεύθερα.

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have modified other sections).¹⁴

Date of *HA* and Its Relation to Other Treatises of Aristotle

About 40% of books I–IV and IX(VII), as measured by counting lines, discusses data that are reported in similar language in other biological treatises. Comparison of these passages suggests that the other treatises were the source of *HA*, not vice versa. For while there is often no basis for judging which came first, nevertheless in a considerable number of passages the *HA* version is more condensed, less informative, even less intelligible, suggesting that it is a summary or extract of its doublet in the other treatise, while the opposite is never the case. For example, compare the accounts of breathing at *HA* I 492b8 and *Resp.* 473a19: the latter is not adding causal explanation to facts taken from *HA*, but it is itself the full factual account of which *HA* gives a summary that is barely lucid unless explained from the *Resp.* account. Again, *HA* II 498a3–31, comparing the ways in which animals bend their legs, seems to be extracted from the longer account in *IA* 12–16; in particular 498a5–8 is so concise as to be hardly intelligible, where *IA*

¹⁴ [Balme did a detailed analysis of "The structure of *HA* with special reference to (a) extracts from other treatises; (b) data conflicting with other treatises; (c) stratification and later additions." At this writing it is not yet published.]

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712a1 explains the action fully with a diagram. For other examples, compare the following *HA* passages with the corresponding passages in other treatises:¹⁵

I 488b25-26	<i>Mem.</i> 453a6-9
489a8-12	<i>GA</i> I 715a18, 716a14
17-19	<i>PA</i> II 647a19, 653b23, 656b35; <i>de An.</i> II 413b4, <i>passim</i>
490a26-33	<i>IA</i> 707b5, 708a7, 709b20; <i>PA</i> IV 693b7
496b34-487a13	<i>PA</i> III 671b3-28, 672a23, b7
II 503b29-504b9	<i>PA</i> II 657a28-b22, 658a12, 660a29, III 664b25, IV 692b3- 695b1; <i>IA</i> 710a30, b20-29; <i>Resp.</i> 477a34
III 511a22-27	<i>GA</i> I 719b24-720a22
520a1-6	<i>PA</i> III 667a23-32
IV 532a6-10	<i>PA</i> II 661a15-25

In book I about 40% consists of data reported elsewhere, and of this about one third shows signs of being summarised from the other accounts. In II about 45% corresponds with other treatises, in III and IV about 35%, and again at least one third of these passages contain distinct signs that they are the derivative reports while the other treatises are the source. In V and VI about 12% is comparable, in IX(VII) 35%, while in VII(VIII) only 120 lines cover

¹⁵ [This tabulation is drawn from a full "Index of Comparable Passages", not yet published.]

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common ground and in VIII(IX) only 50. These figures reflect the fact that V and VI contain much data on generation not treated elsewhere, and VII(VIII) and VIII(IX) deal with "activities and characters" outside the purpose of the other works. If so much as one third of the comparable passages are evidently taken from the other treatises, while the remainder offer no basis for judgement either way, and there are no passages requiring the opposite conclusion, then there is a strong probability that the other treatises preceded *HA*.

This probability is supported by the numerous data in *HA* which not only conflict with data given elsewhere but ought to have modified some theoretical statements made in the other treatises. Such data are the oviparousness of some selachians (VI 565a22), the sensitivity of the sponge (I 487b9), the four-footed insect (I 490b1), the egg-laying insects (V 550b26), the cephalopod brain (IV 524b4), and others. Where such data are counter-instances to general rules stated in other treatises, the probability must be that the counter-instance was learned later. *HA* also contains information which, while not conflicting with other works, should surely have seemed worth mentioning, such as the fertile species of half-ass (I 491a2, VI 577b24), which could be thought an exception to the sterility of mules discussed at *GA* II 747a25. There are also many differential features which are treated as significant in *HA* but are hardly noticed in the other treatises: the

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crest in birds (I 486b13, II 504b9, VII(VIII) 592b24, VIII(IX) 617b20, 631b10); "hairlike" structures in marine animals, probably unrecognised gills (IV 524b21, 529a32, 529b30); mammalian teats (I 493a13, *passim*); the skin (IV 532b3, *passim*); tissues able to regenerate (I 493a28, II 508b6, III 515b19, *passim*; in *PA* a rare mention at II 657b3); the "black" viscera (IV 529a22, 530a34, 530b13, 31; rarely *PA* IV 680a14); stone-like "chalazae" (VI 560a28); excreta, which becomes the normal sense of residues, *perittomata*, in *HA* as distinct from the other treatises; the reader will note many others. On the other hand the other treatises contain no other features which ought to find a place in a collection of differentiae but are not in *HA*. In passages which are not paralleled in other works the *HA* shows a great deal more knowledge, especially in certain topics such as the brain, marine animals, birds. Of 560 animal species mentioned altogether by Aristotle, 390 occur only in *HA*. The other treatises contain little specialist knowledge, whereas *HA* quotes extensively from fishermen, stock farmers, bee keepers, eel breeders, bird fanciers, etc. It shows more skill in distinguishing significant features as noted above (compare too the accounts of the crustaceans in IV 1-3, and of the selachians in VI 10). It does not however depart from Aristotle's more fundamental theories, for example in teleology, the *scala naturae*, generation, *pneuma*, as some critics have suggested (these are

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each discussed in notes to the relevant passages).

All this evidence suggests that Aristotle wrote *HA* I–IX as a study of animal differentiae, based upon the theory of diaeresis as reformed in *PA* I 2–4; that he collected the data initially from the other treatises, and then proceeded to complete the study from new reports, a process which was still unfinished at his death. The likeliest period for the main bulk of the work is his Lesbos visit (344–2) and subsequent years, that is in middle life. Such a suggestion of course conflicts with the assumption that the *HA* was the collection of data which were to become the subject of explanation in the other treatises. That assumption rests on two grounds. First, at 491a11 Aristotle says that the enquiry into facts must precede the enquiry into their causes, so agreeing with his reminders in *An. Po.* and *PA* I that the “*hoti*” must be ascertained before the “*dioti*”. Secondly, the other treatises refer to *HA* as already written, while *HA* does not refer to them except in the future tense (“will be said”, III 523a14, probably referring to *GA* I 721b3). But against this it can be said that the other treatises do actually quote all their own data before giving explanations, and have no need of *HA*. And their references to *HA* and to each other look like later insertions; for some cross-refer to each other (cf. *GA* I 721a26, *PA* II 653b16, 655b25); none refers to data required for the argument, but only to further information; none is integral with the context. They indicate the order

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of exposition, not of composition, and the probability is that they were inserted when the treatises were arranged into a teaching course at the Lyceum in Aristotle's last period. There seems therefore to be no compelling reason, either a priori or textual, to believe that *HA* was written before the other biological treatises.

Book Ten

The decisive reason for excluding book X from *HA* must be that expressed by Gaza: the book is occupied with causal explanation, not with 'historia'. Books I–IX do not refer to it, nor it to them. It does however share some common ground with *GA*, including a long description of mola uteri at 638a11 in words almost identical with *GA* IV 775b27 ff. There *GA* refers to an explanation given "in the problems". The extant *Problems* do not contain it, but the context in *HA* X is written in the question-and-answer style of the *Problems* and is probably the passage to which *GA* refers. In the subsequent explanation of mola, it is the *HA* X passage which is much fuller while the *GA* explanation looks like a summary of *HA* X, a reversal of the relationship between *HA* I–IX and the other works.

Gaza thought that *HA* X should be placed with *GA*. Later scholars however have doubted the book's genuineness (see Vol. I, p. lvi), objecting to (i) its theory of female sperma, together with its use of *pneuma*; (ii) incorrect syntax and unusual vocabu-

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lary; (iii) resemblances to the Hippocratic treatises. The last two objections are insubstantial. Nearly every treatise of Aristotle in its extant form contains unusual words and loose syntax, and every breach of classical rules in *HA X* can be paralleled in major works. The Hippocratic treatises agree with *HA X* about the need for mixture of male and female sperma (e.g. Hipp. *genit.* 7, VII 478 L), and about commonplace matters like the correct positioning of the uterus for conception, and the need for menstrual regularity. But *HA X* conflicts with Hippocratic doctrine when it argues — like *GA* — that seed does not come from all parts of the body (637a12, contra Hipp. *nat. puer.* 32, VII 542 L), and in its explanation of mola uteri (contra Hipp. VIII 148, 360). Comparison of the passages adduced by Rudberg shows that the similarity, whether doctrinal or verbal, does not extend beyond obvious points of conventional wisdom. Nor does *HA X* suggest an iatric origin in either intention or content: its data are the correct states and functions of the uterus, not the typical Hippocratic discussion of diseases and remedies (except occasionally to contrast the correct state). Its theme, constantly repeated, is that the female must contribute sperma to generation. It is not a study of sterility: its ancient title clearly derives, as was often the case, from its opening words, and is not a statement of contents.

The first part, down to 636b6, describes the correct actions and conditions of the uterus, which

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should be directed always to its ability to emit seed into the cervix and then draw it in again mixed with the male seed. The discussion starts from the fact that some couples fail to generate with each other. The significance of "each other" becomes clear presently, namely that successful generation depends upon a harmonising of the male and female contributions, which they may achieve with other partners if not with each other. 636b6 states the conclusion that simultaneous emission by male and female is required, and 636b23 leads to supplementary arguments proving the female contribution. Lastly at 637b32 the problem is raised, why do not all females generate the equivalent of wind-eggs, and what is the status of the mola uteri.

The theory of *GA* does not contradict *HA X* but refines its formulation. The female must contribute to generation, but her contribution is not fully concocted seed like the male seed: both are residues of useful nutrition drawn from the blood, but the female's is concocted only so far as to possess nutritive soul (hence wind-eggs). Aristotle speaks of female seed in *GA* too, meaning this qualified sense. When he says that the female's contribution is the matter, he refers to this partly concocted uterine blood, i.e. proximate matter, which is far from being inert but contains the female's characteristic "movements" which combine with the male seed's movements to produce family resemblances (*GA* IV 3). Both *GA* and *HA X* emphasise the need for sym-

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metry between the two contributions, but whereas *HA X* bases this upon simultaneous emission, *GA* bases it upon proportionate heat and quantity. Other refinements are: *GA* identifies the female contribution with the menses, while in *HA X* it is an unspecified fluid; *GA* denies that the female must emit into the cervix, though allowing that it may happen; *GA* explains the in-drawing of seed into the uterus by heat instead of by pneuma (as at *HA X* 637a17, which is the only use made of pneuma in *HA X*); *GA* denies that in multiple pregnancy different parts of the uterus receive portions of seed. On the other hand there are striking resemblances: the arguments from multiple pregnancy (637a5: 723b9, 729a6), and from wind-eggs and mola uteri; the concepts of residues (634b8, 638b26: 746b27, 775b23) and of cotyledons (635b3: 745b33). But the most significant agreement is that the uterus is an active instrument of generation that must contribute, and that it has a proper position and function. This view directly opposes all who held with Plato that the uterus moves about casually and is merely a receptacle within which the male seed develops. That was a common view, and was obviously the chief alternative to Aristotle's view that both male and female contribute to the formation of the embryo. Yet it is strangely ignored in *GA*, although it would seem to demand refuting first. But Aristotle's apparent neglect to refute it there is explained if he had already done so in *HA X*. While

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therefore he could hardly have written *HA X* after *GA*, it is a defensible supposition that he wrote it earlier.¹⁶

The Text

The transmission of books VII–IX in the Greek MSS was not affected by doubts of authenticity, which in the case of these books date only from the 19th century, but has been integral with that of I–VI except that IX(VII) was always placed as IX until Gaza re-ordered it as VII. The order of the books is here restored to VII(VIII), VIII(IX), IX(VII). Gaza also re-ordered parts of VIII(IX) 631–633, and early editions followed him; but since Bekker restored the MSS order editors have followed Bekker, as this edition does. Bekker's chapter divisions are retained for convenience of reference, although they do not occur in the MSS nor in the earliest printed editions but appeared in this form in the 3rd Basel edition (1550) upon which Bekker based his text.¹⁷ Camus and Schneider, in their editions, made different chapter divisions. (The chapter divisions and chapter headings given in modern editions and translations therefore have no authority; indeed

¹⁶ Fuller details in my "Arist. *HA* Book Ten", *Aristoteles—Werk u. Wirkung* (essays presented to P. Moraux) Berlin 1985, I. 191–206.

¹⁷ See Additional Notes, p. 542.

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they are often misleading, especially when they suggest the natural history interpretation of *HA* rejected above.)

Book X, however, whose claim to a place in *HA* has been doubted since at least the 15th century, is lacking in many Greek MSS. Those that do have it have all derived it, some directly and some indirectly, from the extant Vaticanus gr. 262. Pages 636-637 were re-ordered by the Aldine editor, and again by Scaliger and Schneider, but the MSS order was restored by Bekker and is followed here. The book was excluded by Gaza and by some editors including Camus.

The Aldine editio princeps of 1497 is the only text of *HA* that has ever been based primarily upon the Greek MSS; it is a good text, but suffered through not consulting the α family (C^a A^a , etc.). The numerous 16th and 17th century editions are all derived from the Aldine, but make many conjectural alterations which are mostly either guesswork or devised from Gaza's 15th century Latin version; few if any of their variants agree with the Greek MSS or with the far more accurate but less readable Latin of William of Moerbeke (which was largely taken from the α family; William's version was never printed, whereas Gaza's went through many printed editions). Camus (1783) was the first to make serious use of some MSS, including C^a ; he altered the text considerably, partly from these MSS and partly from his own conjectures. Schneider (1811) introduced

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many more changes, some quite extensive, based partly on MSS readings which he took from Camus (some wrong) but largely on William's Latin whose value he rightly recognised but possibly over-estimated. Bekker (1831) took the text primarily from the Basel 3rd edition (1550), itself eventually derived from the Aldine, but thoroughly checked it against the most important Greek MSS. His aim was to return to the MSS tradition; most of his changes agree with A^a C^a; he admitted few conjectures. Although his reports of the MSS are often inaccurate, Bekker's instinct for Greek was so sound that his text of *HA* is outstandingly the best and the nearest to the MSS. Some subsequent editors have followed Bekker closely (Bussemaker 1854, Louis 1964), but conjectures were introduced on a wide scale by Piccolos 1863, Aubert and Wimmer 1868, and Dittmeyer 1907. The last two believed most of VII-X to be both spurious and especially corrupt. Dittmeyer collated the three most important MSS (C^a, A^a, D^a) in order to correct Bekker's reports, but his consultation of other MSS was no more than occasional and his reports of them are mostly taken from Bekker. No editor but Camus, Bekker and Dittmeyer appears to have consulted Greek MSS at all. For a list of 16th and 17th century editions see Camus' introduction, for later editions see Vol. I of this edition, since when there have appeared the Budé edition by P. Louis and the Italian translation (excluding VIII(IX) and X) with notes and essays by

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D. Lanza and M. Vegetti (Torino 1971); both these editions rely on Dittmeyer's, as does J. Barnes's translation of book X in the revised Oxford translation (Princeton 1984).

Since Bekker's text, which is often difficult, has come under suspicion because of the inaccuracy of his apparatus criticus, while other texts differ widely and are grossly conjectural, I thought it best to establish the MSS tradition, as the only secure base from which one can set out to make conjectures. To this end I have collated all the Greek MSS that I can trace, and have tried to present the most authoritative text that they offer, together with a report of significant variants.¹⁸ Even so the text cannot be free of conjectures, for most of the extant MSS themselves are not simple copies whose variants are merely mistakes, but intelligent editions containing the scribe's deliberate conjectures in place of words which he thought mistaken. I have tried to identify such conjectures and to trace their origin or basis, in order to assess their authority; but often one cannot tell whether they derive from another source or from guesswork. Nevertheless the variants of scribes are so much more modest than those of later editors that it seems reasonable to draw a line at the point when printing began. In

¹⁸ [Consistent with Loeb practice the variants are given in this edition for the most part only at places where this text departs from Bekker's; a significant exception is explained in note 21 below.]

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this edition therefore no editorial conjectures from Aldus onwards have been admitted to the text; those of Bekker and a few others that seem most worth considering are given in the apparatus or in the English notes. Where the best traditional reading is impossible, it is marked with an obelus in both Greek and English texts, and here the footnote should be consulted for suggested emendations. In choosing between variants I have been eclectic, judging each case on its merits in the context, for as will be seen there is little basis for regularly preferring any one MS or family. The result, which is not far from Bekker's text, is admittedly more difficult sometimes and more roughly expressed than in the drastically "emended" editions, but it is often more subtle and interesting than the easier and anodyne conjectures.¹⁹

There are certain general inferences that may be extracted from a detailed study of the Greek MSS and Latin versions. The Greek MSS have proved to fall into three family groups, not two as hitherto supposed. D^a with its group of copies does not agree with P and its group, but is an independent witness alongside the A^a group. The belief that D^a and P formed one family, inferior to A^a C^a, is explainable as a historical accident. It originated with Camus (I. xxxv), who had asked for a collation of the best of

¹⁹ [In the remainder of the Introduction an extract is presented of the key conclusions of Balme's detailed study of the Greek MSS and Latin versions.]

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the five Vatican MSS listed by Foggini, and was unluckily advised to use Vat. 1339 (= P). He did not obtain reports from D^a, but after checking Vat. Pal. 260 concluded that all the Vatican MSS were of one family, from which he rightly distinguished C^a (and later A^a). Camus therefore never saw any of the D^a group but consulted only MSS of the C^a and P groups (namely Laurent. Plut. 87.4, Vat. 1339, Paris. 1921, Ambros. 462) and reasonably suggested "two families". This has been repeated by subsequent scholars (but not by Bekker, who expressed no judgement), although even Bekker's limited apparatus shows that D^a and P do not belong together, and Dittmeyer himself pointed out that D^a is both different from and superior to P. In fact all that D^a and P have in common is that they are not C^a. Moreover D^a has proved to be arguably the most plausible and complete MS, while P is among the worst and contributes nothing.

A second inference is a warning to stylometrists that in dealing with *HA* VII–X they are on infirm ground. As the full apparatus will show, it is the little words—δέ, τε, γε, γάρ, καί and others that may be represented by small signs—that are most vulnerable: for instance, in the first five Bekker pages of VIII(IX), fifty such words in strategic positions are subject to variation. Further, differences involving word order are affected by stylistic "diorthisis", in which the scribes have shown dissimilar tastes. In many cases there seems to be no way of

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establishing which version is correct. More generally, the extant MSS are all so far from their source that it is, I am afraid, fanciful to suppose that we can recover the original formulation with any exactness. The most that is possible is to show which version is older, which makes better sense, which is more like 4th century Greek.

Thirdly, in observing the mis-reports made by far better scholars than myself, I realise that I cannot hope to have avoided making many mistakes too. The most likely are omissions; for when reading a MS, so long as its grammar and sense are acceptable, one easily overlooks variants, especially in particles and in word order. While therefore I have done my best to avoid positive mis-reporting, I must advise my colleagues to let the apparatus speak for itself but not to put words into its mouth, i.e. not to argue *ex silentio*.

The Greek Manuscripts²⁰

The 19 MSS listed in the table of Sigla which follows this Introduction are all that I know to contain

²⁰ For an authoritative account of these MSS see *Aristoteles Graecus*, edited by P. Moraux and collaborators at the Aristoteles-Archiv, Berlin (Vol. I, 1976). A. Wartelle's *Inventaire des MSS grecs d'Arist.*, Paris 1963, relied on library catalogues and therefore contains many errors. L. Dittmeyer, *Untersuchungen über einige HSS u. latein. Übersetzungen d. arist. Tiergesch.* (Progr. Würzburg 1902) together with the preface to his edition of HA 1907, gives a

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books VII–IX; nine of them, listed at the head of the apparatus for book X, also contain that book. Since half of them have never been collated for *HA*, and the reports of the remainder made by Camus, Bekker and Dittmeyer are known to be defective, I felt it necessary to collate all nineteen in full, so as to ascertain not only what each says but also which seem to be independent witnesses, and with what reliability. I have read, not the MSS themselves, but microfilms of them supplied through the courtesy of the libraries named in the list, to all of which acknowledgements and gratitude are due. The microfilms have clearly shown the configuration of the script, except in the damaged Taurinensis 287 C.I.9, but have not distinguished the colours, so that separating the different hands has been uncertain.

In books VII–IX these nineteen MSS fall into the three families marked α , β and γ , so far as their first hand is concerned, with no residue of idiosyn-

reliable account of Laurent. 87.4 and Marc. 208, but only an impressionistic survey of the others. Book X is thoroughly examined in G. Rudberg, *Zum sogenannten zehnten Buche d. arist. Tierg.*, Uppsala 1911, which unfortunately has many errors but usefully reviews the question. The list and description of MSS in P. Louis' edition of *HA* (Budé) Vol. I (1964) xlvii relies on Dittmeyer and Wartelle and is erroneous in many places. Several of these MSS are judiciously discussed in D. Harlfinger's wide-ranging study, *Die Textgesch. d. ps.-arist. Schrift περὶ ἀτόμων γραμμάτων*, Amsterdam 1971.

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cratic MSS. But in book X the position is quite different: those members of the α and γ families which include X have obtained it directly or indirectly from the β family.

While these three families are close enough to indicate a common ancestor, their extant representatives show the mutual independence of the families. The γ family does not have significant readings that are omitted by $\alpha\beta$, but it exhibits many considerable variants. The α and γ families omit much that β has, while the reverse is not true; this suggests a greater authority in β . Although I have not deliberately given more weight to any one MS or family, but have tried to select the likeliest variant in the context of each case, the result has been that the β readings are in the majority.²¹ The γ family shows enough agreement and disagreement with each of the others to suggest that it did not derive from either but from a more remote common ancestor. Only rarely however does it exhibit the sort of reading that might claim seniority.

The conclusion, on the evidence of books VII–IX, is that there is no “best” MS or family, whose readings should automatically carry more weight.

²¹ [Balme's final revision (through VIII(IX) 624b31) added over 200 readings to that already existing majority. I have therefore decided to include in the critical apparatus for the remainder of the text the variant readings wherever Balme (in agreement with Bekker) did not read with the β MSS.]

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My analysis of the agreements and disagreements among the MSS shows that C^a A^a do not deserve preference. D^a has the best claim, but there are reasons against trusting it unequivocally. It was however a mischance that Camus received no reports from D^a , and concluded that the Vatican MSS were of one family; this has led editors to undervalue D^a . For not only is D^a unrelated to P , but P itself is the least reliable and least influential of all extant MSS of *HA*. It is full of unique mistakes and omissions. Though Dittmeyer claims that it was the source of readings in several other MSS including m , O^c , T^c , these claims do not survive examination. The only merit of P is its easy legibility.

The α Family: C^a , A^a , G^a , Q , F^a , X^c

The omissions and disagreements in C^a and A^a are enough to show that neither was the model for the other. Their agreements however show that they shared an ancestor closer than the common ancestor of all three families. In their disagreements the advantage usually lies with C^a , but it is difficult to draw any inference from this since the two MSS are so different in character: C^a shows scholarly ambitions, while A^a in its first hand is an incompetent simple copy. There are no apographa of C^a , nor any sign of its influencing other MSS. A^a on the other hand is the model, direct or indirect, of the other members of the α family for VII–IX. Besarion owned A^a , G^a , Q , F^a , so that their corrections,

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with their complex agreements and disagreements, presumably reflect the scholarly activity within Bessarion's circle.²² The choice of F^a to be the model of X^c suggests that it was regarded as the best corrected of Bessarion's four MSS of HA. Much thought had evidently been given to the corrections in A^a, G^a and F^a, which are not simple copies but learned editions. A^a*pr* however was initially so bad a copy that even with all these corrections it still does not reach the standard of plausibility found in D^a. C^a is initially better than A^a, but its corrections are insignificant and it was apparently neglected. In their extant state, the usefulness of the α family has been over-estimated; nevertheless they have chronological seniority and their mistakes might sometimes be nearer than later conjectures to the truth.

The β Family: D^a, S^c, O^c, T^c, R^c, V^c

D^a Vaticanus Gr. 262 is believed to date from the 14th century. It contains only HA I–X. It appears to be not a scholar's working text but a fair copy; below the last line the scribe has written περιγραφής

²² The account of these MSS and their filiation by E. Mioni, *Arist. codices qui in bibl. Venetis adservantur*, Padova 1958, is unreliable; e.g. his contention (p. 54) that Marc. 207 copied and corrected HA X from Vat. 262 is based on only four citations, two of which are false reports by Bekker and a third is a misprint; he also failed to see that Q is a copy of G^a (cf. Harlfinger *Textgesch.* 183).

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ἀληθοῦς. D^a has few mistakes, and no marginalia except rare subject-indicators like "on the elephant". The few corrections are in the same hand. Book X begins on a new folio but appears to be in the same hand, while IX ends exactly at the end of the preceding verso. The other β MSS are apographa, direct or indirect, of D^a.

The γ Family: E^a, (ii) P K^c M^c, (iii) m n L^c

Like the extant α family, these do not contain book X except adventitiously in L^c, where it is copied from S^c. In VII–IX the pattern of agreements does not suggest that any extant γ MS is the model of any other, but they do fall into the above groups while also sharing a common ancestor distinct from α and β. Their relative dates have not yet been determined. P was once thought the oldest, but recent opinion has placed it in late 14th or even 15th century; this would leave E^a and m as probably the oldest.

The Aldine Editio Princeps 1497

HA I–IX is printed at the beginning of Vol. III, followed by other works of Aristotle and Theophrastus, and finally by HA X on unnumbered pages at the end. I have used the British Museum copy, I.B.24423. The books are re-ordered as in Gaza, IX becoming VII, and from 631b19 to 633b8 the text is re-ordered as in Gaza and L^c. Like all the Greek MSS, the Aldine text is continuous within each book,

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having no chapter divisions nor headings. Book X was omitted in the first preparation of the volume, but was then added at the end with an apologetic note. The text of X is re-ordered by transposing 636b33–637b15 to follow 636a6.

The editing of *HA* was done by Aldus Manutius himself with the advice of Bondini, Leonicensus and other scholars. Sicherl and Harlfinger have established that for VI–X the editor used a copy taken from *L*^c and checked against one of the *D*^a group.²³ This has now been more precisely confirmed. For *HA* VII–IX the Aldine's model was in fact *L*^c; the editor selected some but not all of the readings of *L*^c*rc*; he checked *L*^c against *O*^c*pr*, often preferring *O*^c; he made numerous minor conjectures, at least one of which he probably owed to a Latin source. Perhaps strangely, there is no sign that he used Gaza directly; certainly he did not use him for the lacuna at 604b16. Gaza's change of IX to VII was already carried out in *O*^c, and his transposition of passages in 631–633 was carried out in *L*^c (and marked in *O*^c), so that the Aldine could have obtained both changes from them. Book X was excluded by Gaza; the Aldine's inclusion of it may even suggest a reaction against Gaza.

²³ M. Sicherl, *Handschriftliche Vorlagen der Editio Princeps des Arist.*, Mainz-Wiesbaden 1976, 26.

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Later Variae Lectiones

Vat. Ottobon. 147 is one of several 16th and 17th century MSS containing "notes" on *HA*. It does not contain *HA* itself, as mistakenly stated by Wartelle and Louis, but a collection of variants with reference to the Aldine 1497 edition; variants in *HA* I-IX occupy ff. 22-45, those in *HA* X are on f. 63r. Most of the variants agree with Q, including some that are unique in Q. Other sources are mentioned as 'alter' or 'alii'. There are agreements with A^a, corrections in A^a, a β MS (other than S^c) and the first Basel edition 1531; there are a few other readings whose source I have not identified, and which may be conjectures.

Camus quotes a large number of variants written by Canisianus in the margin of a copy of the Juntine edition of 1527, now in the Bibl. Nationale, Paris (Rés. R 782), which I have not examined. The quotations agree significantly with F^aX^c at eight places, but one other agrees only with Gaza and R^c.

Two other collections of variants, mentioned by Dittmeyer *Hist. Anim.* xvi, are contained in Vat. Ottobon. 316 and Vat. Barberinianus 132 (Wartelle 1916 and 1867; they do not contain the text of *HA*, as mistakenly stated by Louis). I have not examined these. Nor have I traced many of the numerous new variants offered by the 16th century editors, translators and commentators. But it may be doubted whether they result from consultation of

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MSS otherwise unknown; those that I have encountered appear to be editorial conjectures made *ad sensum*, sometimes based on Gaza.

The Latin Versions

Michael Scotus translated *HA* early in the 13th c. from the 9th c. Arabic version attributed to Ibn al-Biṭrīq (which some think may have been itself translated from a Syriac version); the Greek original therefore far antedated the extant Greek MSS. For the Latin I have used the early 13th century MS Caius 109 (photographed by courtesy of the Library of Gonville and Caius College, Cambridge), together with photographs of Vat. Chisianus E.VIII. 251 and Gotoburg. Lat. 8; the last is heavily corrected by later hands, mostly agreeing with Albertus. In addition for book X I have used Rudberg's collated transcript. In Scotus book X follows immediately upon IX(VII), and the duplicated words are rendered (differently) both at the end of IX and at the beginning of X. He also includes the redundant doublet at the end of X. The Arabic version exists (with omissions) in MS Add. 7511 of the British Museum, which kindly provided photographs. There is a complete copy in Teheran. The late Dr. R. Walzer read *HA* I with me, enabling us to compare it with both the Greek and the Latin, and this comparison showed that Scotus kept closely to the Arabic but the Arabic itself is no more than a paraphrase of the Greek and sometimes misrepresents entire

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passages. Moreover the Arabic translator evidently found many of the Greek words either unfamiliar or corrupt, and attempted merely to transliterate them; Scotus transliterates them again, e.g. 586a30 *πρόφορος* has become *stakaroz*. There are many such nonsense-words, so that Scotus's reading is often useless for determining difficulties, e.g. 601a3 *ἐμπίς α: ἀσπίς βγ: ankiz* Scot.

Where the Greek underlying Scot.'s version can be determined, it mostly agrees with the α family, but in several places where α is clearly wrong, Scot. has a better reading. Several of these are surprising but worth consideration, but many are quite wild; some are explanatory additions.

Some of Scot.'s readings which disagree with α agree with β; but there is no evidence that he derives from two separate Greek sources (as Guil. does); it would seem more likely that the Greek original was better than the extant α MSS and consequently less divergent from the β family. Agreements with γ against αβ, however, are doubtful.

Scot.'s readings therefore are so erratic that one could not rely on his testimony alone; but where he and Guil. agree upon a reading which is both unambiguous and plausible, I would give as much weight to it as to a Greek MSS family. Especially in book X, where the Greek tradition hangs upon one MS only, we are compelled to rely more on Scot. and Guil. In this regard it is interesting that Scot.'s original in

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VII-IX agreed with the α family: if the same model was used for X, then that ancestor of C^aA^a did include X, unlike them.

Albertus Magnus produced his treatise *De Animalibus* in the mid-13th century. Books I-X are a close paraphrase of Scotus HA I-X interspersed with explanations and expansions; this explanatory material draws upon Avicenna's *De Animalibus* (excerpted from Aristotle by Avicenna, translated from the Arabic by Scotus) together with Albert's own reports of North European animals and—apparently—his knowledge of Pliny. He seems also to have contributed conjectures of his own. Albertus himself read neither Greek nor Arabic, so that his testimony speaks only for Scot.'s Latin and for the background of Latin learning from which scholars of his time might make their own conjectures. Whether he used Guil. is debatable. It is possible that he was himself used by Trapezuntius, Gaza and the Aldine editor. Beyond noting occasional agreements, I have not attempted to trace Albert's sources, nor his influence upon others. He is not an independent witness to the Greek original.

William of Moerbeke (Guil.) made his translation in the same period as Albert's treatise, to which it does not appear to owe anything. Many MSS of it survive, often varying considerably. I have used microfilms of Vaticanus 2095 and Fesulanus 168, and also Rudberg's transcript of HA X. William's translation was intended to assist scholars to under-

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stand the Greek, and was therefore a word-for-word rendering. It comprises books I–X in the traditional order, though some later MSS have separated X, possibly under Gaza's influence. In VII–IX William agrees mostly with C^a, including places where C^a disagrees with A^a, but he agrees with Scotus in several places where C^a is clearly wrong. On the other hand, unlike Scotus, William sometimes agrees with D^a against C^a. Occasionally he gives both the α and the β reading, which suggests that he worked from two sources.²⁴ He does not agree with readings peculiar to γ . In X, however, he gives no evidence of a second source. Moreover his model seems to have been more illegible or mutilated in X. He differs from D^a at 160 places in X, half of them being omissions. Many of these omissions are supplied by Scotus. Some of William's readings in X agree with Scotus against D^a and may be right. William's unique readings are often plausible and worth considering as independent evidence. I have thought it justifiable to accept some of these into the text (most have been accepted by other editors at one time or another), but only when the Greek original is unmistakable: I have not followed Schneider in devising conjectures based upon William.

²⁴ On William's two versions cf. H. J. Drossaart Lulofs, *Arist. De Gen. Anim.* (OCT) xxv, and *Arist. Latinus* XVII.2.v, p. xix.

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Trapezuntius (George of Trebizond) translated several of Aristotle's treatises, including *HA*, in the early 1450s. I have used microfilm of Laurent. Plut. 84.9 (courtesy of Bibl. Medicea Laurenziana, Firenze). Trap.'s translation of *HA* was immediately superseded by the better version of Gaza, and seems to have had no influence. It is not a verbatim rendering, but explanatory like Gaza's. His main Greek source is evidently *G^a* including *G^{arc}*. He also relied heavily on William and followed some of his variants. However, in a note at 503a1 in his archetype Urbinas 182, as reported by Dittmeyer *Hist. Anim.* xxi note 3, Trap. claims to have consulted three Greek MSS, so that we must ask whether he saw one that is no longer extant. I have found no evidence of this. Dittmeyer did not compare Trap. with *G^a*, but concluded that he used either *A^a* or a near relation which he then corrected from *D^a*. But Trap.'s readings, including all those quoted by Dittmeyer (*Unters.* 27), are explained by *G^a* and Guil. I have found no evidence that Trap. used *D^a* or indeed any other Greek MS but *G^a*. If there was consultation of others, it must have been very limited. As Dittmeyer concluded, there is no reason to regard Trap. as an independent witness to the Greek. He seems however to have used other Latin sources, probably Pliny. He makes less use of Pliny than Gaza appears to. Trap. may also have used Scotus or Albertus. In addition it is possible that Trap. (and Gaza too) used a Greek-Latin word

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list that had not been used by Scot., Alb. and Guil.

Theodoros Gaza started a translation of *HA* for Pope Nicolaus V (d. 1455); a draft was completed by 1458, and a version was presented to Sixtus IV.²⁵ This latter version was printed in 1476 and reprinted many times thereafter. I have used a copy printed in 1560. Gaza's influence was inordinate, and is already apparent in the manus priores of n L^c and in the later hands in E^amS^cO^c. Many of his Latin equivalents seem to originate in Pliny. His conjectures are often plausible, but not always. Gaza mostly agrees with the α family, but quite often with β, only rarely with γ. Sometimes he offers alternatives, as at 612b33 *adolescere* (= αγ) *aut coire* (= β). Sometimes he agrees with Guil. alone and may be making conjectures based on Guil. There is no positive evidence that he used MSS now unknown. Gaza's most striking contribution was the changing of book IX to VII, the rearranging of 631–633, and the ejection of book X. These changes are followed in varying degrees in O^cT^cR^cL^c and the Aldine, as noted above.

Julius Caesar Scaliger composed his translation of book X, with commentary, about 1530, but it was first published posthumously in 1584 by his son Silvanus. The rest of his version of *HA* was published in 1619 in a complete edition of *HA* I–X with commentary, in which the Greek text was that of Casau-

²⁵ [Cf. L. Labowsky in *Med. and Ren. Studies* 6 (1968) 176. Vaticanus 2094 is probably the presentation copy.]

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bon of 1590 modified to agree with Scaliger's version, which was made from the Aldine. Although the 1584 preface speaks of *exemplar Graecum lacerum mutilum inuersum*, it becomes evident that these words are rhetorical and do not refer to a MS but to the Aldine version of the Greek. The *variae lectiones* that Scaliger reports are editorial conjectures in the Juntine edition 1527. There is no evidence that he consulted MSS. There is much evidence, on the contrary, both in Scaliger's translation and commentary and in those of other 16th century editors, that they found the Greek obscure and were less well equipped to translate it than modern scholars; they were all the more disposed, therefore, to regard the Greek tradition as corrupt and to indulge in conjectures. The principal source to which they looked for these was Gaza, to whom Scaliger constantly refers.

Johannes Bernardus Felicianus made a translation of *HA X* which was printed in 1560 (before Scaliger's translation was published) to supplement Gaza's version in a collection of Aristotle's works in Latin (Lugduni, apud haeredes Iacobi Iuntae, Vol. IV, n.d.). It appears to be made from the Juntine edition (Florence 1527) which was itself an emended version of the Aldine, the Juntine emendations being apparently conjectures by Leonicus rather than variants adopted from Greek MSS.

SIGLA

- C^a Laurentianus Plut. 87.4 (Biblioteca Medicea
 Laurenziana, Firenze)
- A^a Marcianus Gr. Z.208 (Bibl. Nazionale
 Marciana, Venezia)
- G^a Marcianus Gr. Z.212 (ibidem)
- Q Marcianus Gr. Z.200 (ibidem)
- F^a Marcianus Gr. Z.207 (ibidem)
- X^c Laurentianus Plut. 87.27 (Bibl. Med. Laur.,
 Firenze)
- a = C^a A^a G^a Q F^a X^c or all but those specifically
 excepted
-
- D^a Vaticanus Gr. 262 (Bibl. Apost. Vaticana,
 Roma)
- S^c Taurinensis R.287 (C.I.9) (Bibl. Naz. Torino)
- O^c Riccardensis 13 (K.1.21) (Bibl. Riccardiana,
 Firenze)
- T^c Laurentianus Plut. 87.1 (Bibl. Med. Laur.,
 Firenze)
- R^c Utinensis VI.1 (Bibl. Arcivescovile e
 Bartoliniana, Udine)
- V^c Neapolitanus 289 (III.D.5) (Bibl. Naz., Napoli)
- β = D^a S^c O^c T^c R^c V^c or all but those specifically
 excepted
-
- E^a Vaticanus Gr. 506 (Bibl. Apost. Vaticana,
 Roma)

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- P Vaticanus Gr. 1339 (ibidem)
- K^c Phillips 1507 (Berlin 103) (Deutsche Staatsbibl., Berlin)
- M^c Mosquensis 240 S (Gosudarstvennyj Istoriceskij Musej, Moscow)
- L^c Ambrosianus 462 (I.56 sup.) (Bibl. Ambrosiana, Milano)
- m Parisinus Gr. 1921 (Bibl. Nationale, Paris)
- n Vaticanus Urbinas Gr. 39 (Bibl. Apost. Vaticana, Roma)
- γ = E^a P K^c M^c L^c m n or all but those specifically excepted
- Ott. Vaticanus Ottobonianus Gr. 147
- Scot. Michael Scotus: Gonville & Caius 109
Gotoburgensis 8
Vat. Chisianus E.viii.251
- Alb. Albertus Magnus, *De Animalibus* ed. Stadler 1916
- Guil. Guilelmus de Moerbeka:
V — Vaticanus 2095
F — Laurent. Fesulanus 168
- Trap. Georgius Trapezuntius: Laurent. Plut. 84.9
- Gaza Theodorus Gaza, *Hist. An.* ed. Lugduni 1560
- Fel. Joh. Bernardus Felicianus, *HA X*, Lugduni 1560
- Scal. Julius Caesar Scaliger: *HA X*, Lugduni 1584
HA I-X, Tolosae 1619
- Ald. Aldus Manutius ed. 1497: Brit. Mus. I.b.24423
- A.-W. Aubert and Wimmer ed. Leipzig 1868
- Barnes Revised Oxford Translation, *HA X* tr. Jonathan Barnes, Princeton 1984

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Bas.	Basel (Grynaeus) 3rd ed. 1550
Bk.	I. Bekker, Prussian Acad. ed. Berlin 1831
Buss.	C. Bussemaker ed. (Didot) Paris 1854, rev. 1887
Camot.	Camotius ed. 1553
Canis.	Canisianus marginalia reported by Camus
Cas.	Casaubon ed. 1590
Cs.	A.-G. Camus ed. 1783
Dt.	L. Dittmeyer ed. (Teubner) 1907
Junt.	Juntine ed. 1527
Louis	P. Louis ed. (Budé) Paris 1964
L.-V.	D. Lanza and M. Vegetti tr. Torino 1971
Pk.	N. S. Piccolos ed. 1863
Rud.	G. Rudberg comm. <i>HA</i> X 1911
Sn.	J. G. Schneider ed. 1811
Sylb.	Sylburg ed. 1587
Th.	D'Arcy W. Thompson tr. <i>HA</i> I-IX Oxford 1910



**ΤΩΝ ΠΕΡΙ
ΤΑ ΖΩΙΑ ΙΣΤΟΡΙΩΝ**

H(Θ)

588a

- I Τὰ μὲν οὖν περὶ τὴν ἄλλην φύσιν τῶν ζώων
 17 καὶ τὴν γένεσιν τοῦτον ἔχει τὸν τρόπον· αἱ δὲ
 πράξεις καὶ οἱ βίοι κατὰ τὰ ἦθη καὶ τὰς τροφὰς
 διαφέρουσιν. ἔνεστι γὰρ ἐν τοῖς πλείστοις καὶ
 20 τῶν ἄλλων ζώων ἵχνη τῶν περὶ τὴν ψυχὴν τρό-
 πων, ἅπερ ἐπὶ τῶν ἀνθρώπων ἔχει φανερωτέρας

^a This book and VIII(IX) immediately follow books I–VI in all MSS earlier than Gaza's Latin translation in the second half of the 15th century. Gaza moved the book placed ninth in the MSS to seventh place, and most editors have followed him. The validity of this change is questioned in the Introduction, and in this edition the MSS order has been restored.

^b The reference is to books I–VI. I–IV dealt with bodily parts, V–VI with generation, which is one part of "activities" (589a2, 596b20). VII(VIII) now proceeds to further activities, beginning with an important introduction on the basic constitutional differences between animals, in accord

BOOK VII(VIII)^a

Such^b then is the nature of the animals in other I
respects, and also their generation. Their activities
and lives differ according to their characters and
nutrition. For even the other animals mostly
possess traces^c of the characteristics to do with the
soul, such as present differences more obviously in

with their environment and nutrition. This introduction
agrees closely with *PA* and the *PN* and may well be one of
the earlier strata of *HA* (588a18–590a18). It looks forward
also to VIII(IX), which deals with characters. But as
VII(VIII) proceeds, clearly introducing later reports, it
extends its scope from nutrition to other ways of preserv-
ing good condition: ch. 12 introduces avoidance of extreme
temperatures by migration, hibernation, etc; ch. 18 com-
pares the effects on condition of sickness, locality, breed-
ing. But the whole is held together by the theme of natural
constitutional health, and there is no sufficient reason to
suspect any sections of spuriousness. Cf. 601a23ff, 607b1,
ἐνημερεῖν, ὑγίεια.

^c Lit. "footprints", cf. 588a33, VIII(IX) 608b4.

ARISTOTLE

τὰς διαφοράς. καὶ γὰρ ἡμερότης καὶ ἀγριότης καὶ
 πραότης καὶ χαλεπότης καὶ ἀνδρία καὶ δει-
 λία καὶ φόβοι καὶ θάρρη καὶ θυμοὶ καὶ πανουργίαι
 καὶ τῆς περὶ τὴν διάνοιαν συνέσεως ἔνεισιν ἐν
 πολλοῖς αὐτῶν ὁμοιότητες, κάθ' ἅπερ ἐπὶ τῶν
 25 μερῶν ἐλέγομεν. τὰ μὲν γὰρ τῷ μᾶλλον καὶ
 ἥττον διαφέρει πρὸς τὸν ἄνθρωπον, καὶ ὁ ἄνθρω-
 πος πρὸς πολλὰ τῶν ζώων (ἐνια γὰρ τῶν τοιού-

^a For Arist.'s general analysis of the differences of soul, as between the less perfected and the more perfected of living things, see *de An.* II 413b2 f and *GA* II 3. Plants have nutritive soul only, which is the capability of growth and generation; animals have sensation as well (here Arist. differs from Plato who credited plants with sensation though not with sense-perception, *Tim.* 77B), and this faculty ranges from a simple sense of touch in the least developed animals up to perception based on the five separate senses; man alone has intellect (nous) and reasoning power. The faculties which he mentions here to introduce the subject—tamelessness, courage, etc.—are capabilities of sensitive soul in its exercise of imagination and desire (*de An.* III 10–12, *EN* I 1102b13). Although this introductory sketch is obviously intended to lead the reader from popular conceptions into more fundamental issues, and therefore is expressed in non-technical terms, it is a link between the analyses of soul in the *De Anima* and the *Ethics* and suggests that basically they are the same analysis.

HISTORIA ANIMALIUM VII(VIII)

the case of humans.^a For tameness and wildness, gentleness and roughness, courage and cowardice, fears and boldnesses, temper and mischievousness are present in many of them together with resemblances of intelligent understanding,^b like the resemblances that we spoke of in the case of the bodily parts.^c For some characters differ by the more-and-less compared with man, as does man compared with a majority of the animals^d (for cer-

^b Arist. does not credit animals with human intelligence either here or elsewhere, but only with resemblances and analogies; cf. VIII(IX) 610b22 note and Introd. p. 7 f.

^c I 486a16-23. The resemblances are (i) analogy, as between kinds (*γέννη*); (ii) the more-and-less, as between forms of a kind (*εἶδη*). In this connection *genos* and *eidos* may refer either to the animal or to the attribute. In the following sentence the attribute is the reference: animal tameness is a form of the same kind of character as human tameness, but differs by the more-and-less; but animals do not have the same kind of art and wisdom as humans, and their capabilities in this area can only be compared analogically with the human capabilities. On this scheme of comparison, see Introd. p. 16 f and Vol. I, Introd. p. lxiii.

^d This sentence is not pleonastic, but presents three cases: (1) some animal types differ from man in degrees of the more-and-less, e.g. in courage, where the lion has more than man but the deer less; (2) man shows other differences of more-and-less compared with the generality of animals, e.g. in tameness; (3) other animals show differences of analogy compared with man, e.g. in art and intelligence, where the swallow shows an analogy.

των ὑπάρχει μᾶλλον ἐν ἀνθρώπῳ, ἔνια δ' ἐν τοῖς
 ἄλλοις ζώοις μᾶλλον), τὰ δὲ τῷ ἀνάλογον δια-
 φέρει· ὥς γὰρ ἐν ἀνθρώπῳ τέχνη καὶ σοφία καὶ
 30 σύνεσις, οὕτως ἐνίοις τῶν ζώων ἐστὶ τις ἑτέρα
 τοιαύτη φυσικὴ δύναμις. φανερώτατον δ' ἐστὶ
 τὸ τοιοῦτον ἐπὶ τὴν τῶν παιδῶν ἡλικίαν βλέψα-
 σιν· ἐν τούτοις γὰρ τῶν μὲν ὕστερον ἔξεων ἐσομέ-
 νων ἔστιν ἰδεῖν οἶον ἵχνη καὶ σπέρματα, διαφέρει
 588b δ' οὐδὲν ὥς εἰπεῖν ἢ ψυχὴ τῆς τῶν θηρίων ψυχῆς
 κατὰ τὸν χρόνον τοῦτον, ὥστ' οὐδὲν ἄλογον εἰ τὰ
 μὲν ταῦτα τὰ δὲ παραπλήσια τὰ δ' ἀνάλογον
 ὑπάρχει τοῖς ἄλλοις ζώοις.

οὕτω δ' ἐκ τῶν ἀψύχων εἰς τὰ ζῶα μεταβαί-

^a For the *scala naturae* cf. *PA* IV 681a12, 686b26, *Plato Tim.* 91D. At *GA* II 733a32 Arist. grades the animals by their methods of reproduction, and regards differences of their natural heat as the basic cause of the differences between more and less 'perfected' animals. Here in *HA* he seems to take movement as his criterion, but offers no causal explanation. All these accounts are analytical, not historical (neither Arist. nor any classical writer proposes

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tain characters of this kind are present to a greater degree in man, certain others to a greater degree in the other animals), while others differ by analogy: for corresponding to art, wisdom and intelligence in man, certain animals possess another natural capability of a similar sort. This kind of thing is clearest if we look at the age of childhood; for in children, though one can see as it were traces and seeds of the dispositions that they will have later, yet their soul at this period has practically no difference from that of wild animals, so that it is not illogical if some characters are the same in the other animals, while others are very like, and others are analogous.

Nature proceeds^a from the inanimate to the an evolutionary theory). The 'continuity' (physical, not mathematical—*συνέχεια* is a succession without gaps) of the scala supports Arist.'s view that the same characters exist at different levels of development in different animals. It does not however mean that there is no boundary between plant and animal or between opposed differentiae; it means only that the boundary is hard to see. The animals that "tend to both sides" of a contrariety (*τὰ ἐπαμφοτερίζοντα*) cannot be on both sides, either actually or logically; nor can they fall between (cf. 589a21 note). The sponge is said here and at PA IV 681a15 to resemble a plant in every respect; but at I 487b9 and V 548b10 it is reported to show sensation, which makes it an animal and not a plant (an indication that those reports are later than PA IV and HA VII(VIII) 1). For sensation may be only faintly developed (588b18), but must be either present or not present.

- 5 νει κατὰ μικρὸν ἢ φύσις, ὥστε τῇ συνεχείᾳ λαν-
θάνειν τὸ μεθόριον αὐτῶν καὶ τὸ μέσον ποτέρων
ἐστίν. μετὰ γὰρ τὸ τῶν ἀψύχων γένος τὸ τῶν
φυτῶν πρῶτόν ἐστιν· καὶ τούτων ἕτερον πρὸς
ἕτερον διαφέρει τῷ μᾶλλον δοκεῖν μετέχειν ζωῆς,
ὅλον δὲ τὸ γένος πρὸς μὲν τὰλλα σώματα φαίνε-
10 ται σχεδὸν ὥσπερ ἔμψυχον, πρὸς δὲ τὸ τῶν ζώων
ἄψυχον. ἢ δὲ μετάβασις ἐξ αὐτῶν εἰς τὰ ζῶα
συνεχῆς ἐστίν, ὥσπερ ἐλέχθη πρότερον. ἕνια γὰρ
τῶν ἐν τῇ θαλάττῃ διαπορήσειεν ἂν τις πότερον
ζῶον ἢ φυτόν ἐστιν.¹ προσπέφυκε γὰρ καὶ χωρι-
ζόμενα πολλὰ διαφθείρεται τῶν τοιούτων, αἱ μὲν
15 γὰρ² πίνυαι πεφύκασιν,³ οἱ δὲ σωλῆνες ἀνασπασ-
θέντες οὐ δύνανται ζῆν. ὅλως δὲ πᾶν τὸ γένος
τὸ τῶν ὀστρακοδέρμων φυτοῖς ἔοικε πρὸς τὰ πο-
ρευτικὰ τῶν ζώων. καὶ περὶ αἰσθήσεως τὰ μὲν
αὐτῶν οὐδὲν⁴ σημαίνεται τὰ δ' ἀμυδρῶς. ἢ δὲ τοῦ
σώματος ἐνίων σαρκώδης ἐστὶ φύσις, οἷον τὰ

¹ ἐστίν ἢ φυτόν transp. a Bk.

² αἱ μὲν γὰρ] οἷον αἱ μὲν a Guil. Cs. Bk.

³ πεφύκασιν codd. Ald.: *adhaerent* Guil. Gaza: *προσπεφύ-
κασιν* conl. Sylb. edd.

⁴ οὐδὲ ἐν a Bk.

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animals by such small steps that, because of the continuity, we fail to see to which side the boundary and the middle between them belongs. For first after the inanimate kind of things is the plant kind, and among these one differs from another in seeming to have more share of life; but the whole kind in comparison with the other bodies appears more or less as animate, while in comparison with the animal kind it appears inanimate. The change from them to the animals is continuous, as we said before. For some of those in the sea might raise for one the question whether they are animal or plant; for they grow attached, and if separated many of this sort are destroyed: for the pinnae grow like plants and the solens^a cannot live after being pulled up. And in general the entire testacean kind resembles plants in comparison with the animals that move about. And with regard to sensation, some of them give no sign at all, others faintly. The body of some has a nature that is fleshlike,^b for example

^a Razor-fish: cf. V 548a5. At IV 535a14 he reports evidence of sensation in them.

^b Flesh, or its counterpart in the bloodless animals, either contains or is itself the medium of touch, which is the minimal form of sensation: cf. *de An.* II 414a3, *PA* II 653b24 and Arist.'s many discussions (*Bonitz Index* s.v. ἀσθή).

- 20 τε καλούμενα τήθηα καὶ τὸ τῶν ἀκαλήφων γένος· ὁ δὲ σπόγγος παντελῶς ἔοικε τοῖς φυτοῖς. αἰὲ δὲ κατὰ μικρὰν διαφορὰν ἕτερα πρὸ ἐτέρων ἤδη φαίνεται μᾶλλον ζωὴν ἔχοντα καὶ κίνησιν. καὶ κατὰ τὰς τοῦ βίου δὲ πράξεις τὸν αὐτὸν ἔχει τρόπον. τῶν τε γὰρ φυτῶν ἔργον ἄλλο οὐδὲν¹
- 25 φαίνεται πλὴν οἷον αὐτὸ ποιῆσαι πάλιν ἕτερον, ὅσα γίνεται διὰ σπέρματος· ὁμοίως δὲ καὶ τῶν ζώων ἐνίων παρὰ τὴν γένεσιν οὐδὲν ἔστιν ἄλλο λαβεῖν ἔργον. διόπερ αἱ μὲν τοιαῦται πράξεις κοιναὶ πάντων εἰσὶ, προσούσης² δ' αἰσθήσεως ἤδη περί τε τὴν ὀχέαν διὰ τὴν ἡδονὴν διαφέρουσιν αὐτῶν οἱ βίοι καὶ περὶ τοὺς τόκους καὶ τὰς
- 30

¹ ἔργον ἄλλο οὐδὲν β P K^c M^c m n: ἐ. ο. ἀ. C^a E^a L^c Ald. Bk. Dt.: ο. ἀ. ἐ. α

² A^arec. F^a X^c β γ Guil. Ald. Cs. Sn. Bk. Peck: προιούσης C^a A^{apr}. G^a Q Gaza Sylb. Dt.

^a Cf. IV 531a18, 33.

^b Cf. PA IV 681a17; this conflicts with I 487b9, V 548b10, 549a8 (see note at 588b4).

^c Cf. V 539a17; some plants are generated spontaneously.

those called tethya and the sea-anemone kind^a; but the sponge in every respect resembles the plants.^b But always, by a small difference at a time, one after another shows more possession of life and movement. And it is the same with the activities of their life. For plants have no other evident function than to make another one like themselves, in those cases where they are produced through seed^c; and similarly in certain animals too one can grasp^d no other function besides generation. Hence, while such activities are common to all, as soon as sensation is added^e their lives differ both in regard to mating because of the pleasure and in regard to the

^d "Grasp", λαβεῖν, lit. "seize": not subjectively "detect" but objectively "obtain" or establish through proper procedure as at PA I 642b5.

^e If "added" is correct, the contrast lies between plants and animals in general. If the alternative "advanced" is read, the contrast lies between the simplest animals (in which no other function can be established but reproduction) and those whose more developed faculty of sensation allows them to experience a significant degree of pleasure (*de An.* II 413b23). A finer development of perception and cognition results from the separation of sexes (*GA* I 731a24, II 732a4), and improved intelligence leads to greater care for the young (*GA* III 753a8). Separation necessitates coition; here *HA* completes the argument by adding that coition, like feeding, is motivated by pleasure (cf. 589a8). "Advanced" therefore makes easier sense, and is preferred by some editors; but "added" has greater MSS authority.

ἐκτροφὰς τῶν τέκνων. τὰ μὲν οὖν ἀπλῶς ὥσπερ
 φυτὰ κατὰ τὰς ὥρας ἀποτελεῖ τὴν οἰκείαν γένε-
 σιν· τὰ δὲ καὶ περὶ τὰς τροφὰς ἐκπονεῖται τῶν
 589a τέκνων, ὅταν δ' ἀποτελέσῃ χωρίζονται καὶ κοι-
 νωνίαν οὐδεμίαν ἔτι ποιοῦνται· τὰ δὲ συνετώ-
 τερα καὶ κοινωνοῦντα μνήμης ἐπὶ πλεόν καὶ
 πολιτικώτερον χρῶνται τοῖς ἀπογόνους. ἔν μὲν
 οὖν μέρος ζωῆς¹ αἱ περὶ τὴν τεκνοποιίαν εἰσὶ
 πράξεις αὐτοῖς, ἐν² δ' ἕτερον αἱ περὶ τὴν τρο-
 5 φήν· περὶ γὰρ δύο τούτων αἶ τε σπουδαὶ τυγχά-
 νουσιν οὔσαι πᾶσι³ καὶ ὁ βίος. αἱ δὲ τροφαὶ
 διαφέρουσι μάλιστα κατὰ τὴν ὕλην ἐξ οἷας συν-
 εστήκασιν. ἡ γὰρ αὔξεις ἐκάστοις γίνεται κατὰ
 φύσιν ἐκ τῆς αὐτῆς.⁴ τὸ δὲ κατὰ φύσιν ἡδύ·
 διώκει δὲ πάντα τὴν κατὰ φύσιν ἡδονήν.

II διήρηνται δὲ κατὰ τοὺς τόπους· τὰ μὲν γὰρ

¹ β: τῆς ζωῆς α γ Cs. Bk.: τοῖς ζώοις L^cpr. n Ald.

² ἔτι α Sn. Bk.

³ πᾶσαι C^apr. Bk.

⁴ τῆς αὐτῆς β γ Gaza Ald.: ταύτης α Guil. edd.

^a That is, by nature: for they *are* (ἐστίν) either land or water animals. Πεζόν means "walking" but is so clearly used for "terrestrial" or "land animal" as opposed to

birth and rearing of the young. Now some simply like plants accomplish their own reproduction according to the seasons; others take trouble as well to complete the nourishing of their young, but once that is accomplished they separate from them and have no further association; but those that have more understanding and possess some memory continue the association, and have a more social relationship with their offspring. Now while one part of living consists for them in the activities to do with the producing of young, a further and different part consists in those to do with food; for these two objects in fact engage the efforts and lives of all animals. And their food differs chiefly according to the matter out of which they are constituted. For each one's growth comes naturally out of the same matter. And what is natural is pleasant; and all pursue their natural pleasure.

But they have been divided^a according to the II

"aquatic" or "water animal" that these terms will be used except at 589a23 and 24 where "walking" is needed by the argument. Arist. amplifies the analysis sketched at I 487a15, showing how the land/water difference is in the animals' basic constitution, which accords with their environment and nutrition. He explains his view at *Resp.* 477b25: "Those that are constituted out of wet matter are in wet places, while those out of dry matter are in the dry. Hence trees do not grow in water but in earth ... The natures of their matter are of the same kind as the locality

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where they exist, the wet in water, the dry in the earth . . . Their states, on the other hand, if excessively hot are better preserved in a cold place, and if excessively cold in a hot place; for the place restores the excessive state to a moderate level. This moderation is to be sought in the places suited to each matter and in accordance with the changes of the general season. For the animals' states can be contrary to the places, but their matter cannot (hence Empedocles was wrong to say that fishes live in water because their nature is hot)". Arist. does not express this as an historical development nor in terms of cause and effect, but as the existing state of affairs: watery animals live in water, and vice versa. When we say that animals are aquatic, we may mean one or both of the following: (i)

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they take in water as opposed to breathing air; (ii) they live and feed in water, whether or not they take it in. With regard to (i), the taking in of water or air is in order to moderate and so to preserve the natural heat in those animals that have more heat (i.e. the more highly perfected animals, GA II 733b1); the lesser heat of the bloodless animals is sufficiently moderated by the surrounding water or air without their taking it in (*Resp.* 470a19, 474b25). With regard to (ii), animals must feed off the same kind of stuff as their original matter (589a6, cf. VIII(IX) 621b4). It follows that all feed and live in the element that matches their bodily "blend", though this may not be the same element that they take in (590a16-18). So the air-breathers that live in water "tend towards both sides" (589a21). This does not mean that they possess opposed differentiae (for that is absurd, 589b12), but that they suggest classification on one side in respect of one pair of opposites (taking in water/taking in air) and on the other side in respect of another pair (living and feeding in water/air). Their living and feeding, however, determines that they are really aquatic. Only the whales and dolphins appear anomalous (589a31) because they take in both air and water, so that the two opposed differentiae do seem to be present together. But the solution is that "take in" is equivocal here: they take in air for cooling, but they also take in water incidentally while feeding, like crustaceans and cephalopods. There is therefore no contradiction, and all these can be classed as aquatic in sense (ii), which is the fundamental sense as we have seen. The whole discussion prepares for the account of differences in nutrition and environment which begins after 590a18, by founding them on the animals' constitutions.

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- 11 πεζὰ τὰ δ' ἔνυδρα τῶν ζώων ἐστίν. διχῶς δὲ
 λεγομένης ταύτης τῆς διαφορᾶς, τὰ μὲν τῷ
 δέχεσθαι τὸν αἶρα τὰ δὲ τῷ τὸ ὕδωρ λέγεται τὰ
 μὲν πεζὰ τὰ δ' ἔνυδρα· τὰ δ' οὐ δεχόμενα μὲν,
 πεφυκότα μέντοι πρὸς τὴν κρᾶσιν τῆς ψύξεως
 15 τὴν ἐφ' ἑκατέρου τούτων ἱκανῶς, τὰ μὲν πεζὰ
 τὰ δ' ἔνυδρα καλεῖται οὐτ' ἀναπνέοντα οὔτε
 δεχόμενα τὸ ὕδωρ τῷ δὲ τὴν τροφήν ποιεῖσθαι
 καὶ διαγωγὴν ἐν ἑκατέρῳ τούτων. πολλὰ γὰρ
 δεχόμενα τὸν αἶρα, καὶ τοὺς τόκους ἐν τῇ γῇ
 ποιούμενα, τὴν τροφήν ἐκ τῶν ἐνύδρων ποιεῖται
 20 τόπων καὶ διατρίβει τὸν πλεῖστον ἐν ὕδατι χρό-

^a Sometimes emended to "three ways" (τριχῶς), to bring it into line with 590a13. Also, at 589a16 some MSS read τὰ δὲ τῷ for τῷ δὲ, which gives the sense "and others . . ." and so makes a third class. But these changes rest on a misapprehension. Διχῶς is verified by 589b22 ἕτερον τρόπον and 590a5 ἀμφοτέρους τρόπους, both of which imply two classes, and by the final division into two classes at 590a16-18. At 590a13 τριχῶς qualifies διηρημένων; it does not refer to the ways in which we speak of the difference (the number of classes which the difference yields) but to the number of cuts—the causes of the natural division: Arist. has been

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places: for some are land animals and others are water animals. But we speak of this difference in two ways^a: (i) some are called land or water animals because they take in air or water respectively; (ii) others, not^b taking it in but being satisfactorily constituted naturally in relation to the blend of cooling that is found in the one or the other element, are called land or water animals not because they breathe air or take in water but in virtue of feeding and living in the one or the other. For many, though taking in air and giving birth on land, get their food from places in water and spend most of their time in

citing three, namely "taking in", "blend", and "feeding". These three causes of division do not yield three classes, because blend and feeding must always coincide since both are determined by the animal's original matter. There are in fact many more causes, such as place chosen for reproduction, but these do not increase the number of classes (for a list of them, see Peck's note Vol. I, p. lxxx). We still speak of only two classes of water (or land) animal, as Arist. says also at I 487a16-26: animals may be aquatic in two ways, (i) that they live and feed in water and take in water, (ii) that they live and feed in water but do not take it in (for some take in air, e.g. crocodiles, and some take in neither, e.g. testaceans).

^b At 589a13 and 16 the negatives οὐ and οὐτε (rather than μὴ) show that in each case the whole clause is negated, not just the participles: i.e. the meaning is not "non-receivers" and "non-breathers" but "not because they take in water or air".

νον· ἅπερ ὡς¹ ἔοικεν ἐπαμφοτερίζουσι² μόνα τῶν
ζώων· καὶ γὰρ ὡς πεζὰ καὶ ὡς ἔνυδρά τις ἂν
θείη. τῶν δὲ δεχομένων τὸ ὑγρὸν οὐθὲν οὔτε
πεζὸν οὐδὲ πτηνὸν³ τὴν τροφὴν ἐκ τῆς γῆς ποι-
εῖται, τῶν δὲ πεζῶν καὶ δεχομένων τὸν ἀέρα
25 πολλά, καὶ τὰ μὲν οὕτως ὥστε μηδὲ ζῆν δύνα-
σθαι χωριζόμενα τῆς τοῦ ὕδατος φύσεως, οἷον αἶ-
τε καλούμεναι θαλάττιαι χελῶναι καὶ κροκόδειλοι
καὶ ἵπποι ποτάμιοι καὶ φῶκαι καὶ τῶν ἐλαττό-
νων ζώων οἷον αἶ τ' ἐμύδες καὶ τὸ τῶν βατρά-
χων γένος· ταῦτα γὰρ ἅπαντα μὴ διὰ τινος
30 ἀναπνεύσαντα χρόνου ἀποπνίγεται. καὶ τίκτει δὲ
καὶ ἐκτρέφει ἐν τῷ ξηρῷ, τὰ δὲ πρὸς τῷ ξηρῷ,
διάγει δ' ἐν τῷ ὑγρῷ.

¹ ὡς om. α Guil. Gaza Sn. Bk.

² -ειν α Guil. Gaza Sn. Bk.: -ει Ald.

³ οὔτε πεζὸν οὐδὲ πτηνὸν β γ Ald.: οὔτε πε. οὔτε πτ. ἐστὶν
οὐδὲ mrec. Gaza Sn. Bk. (om. ἐστὶν): αὐτῶν πεζὸν οὐδὲ α Scot.
Guil. Cs.

^a ἐπαμφοτερίζειν does not mean "be on both sides" but
"tend to both sides": that is, there are some reasons for
classifying them on one side and some reasons for classify-
ing them on the other side. Arist. does not say "they could
be classified as both terrestrial and aquatic", which would

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water. These indeed, as it appears, alone among animals, tend towards both sides,^a for one could both class them as land animals and class them as water animals. But of those that take in water none as a walker or flyer gets its food from the land,^b as opposed to many that are walkers and take in air^c—some indeed to such a degree that they cannot even live separated from the nature of water, for instance the so-called sea tortoises and crocodiles and hippopotamuses and seals and some of the smaller animals such as the freshwater tortoises and the frog kind: for all of these suffocate unless they breathe at certain intervals. Also, they give birth and rear their young on dry land, or in some cases beside the land, but spend their time in the water.

be logically absurd (589b12) because terrestrial and aquatic are contrary differentiae (*Top.* 143b1). Each of his many other cases of ἐπαμφοτερίζοντα (cf. *PA* IV 697a29ff and Peck's account in Vol. I, p. lxxiii) is eventually classified on one side of the opposition. He shows a special interest in animals that seem to defy classification, but does not explain this interest. They do in fact illustrate particularly well his principle that simple dichotomy is unworkable and that differentiae must be taken in groups (*PA* I 643b9).

^bThis is apparently contradicted by the cordylus 589b26 (which suggests that 589b26 is a later addition).

^cThe reader must supply "but get their food in water".

- περιττότατα δὲ πάντων ὁ δελφὶς ἔχει τῶν
ζώων καὶ εἴ τι ἄλλο τῶν τοιούτων¹ ἐστὶ καὶ τῶν
ἐνύδρων καὶ τῶν ἄλλων κητωδῶν ὅσα τοῦτον
589b ἔχει τὸν τρόπον, οἷον φάλαίνα καὶ ὅσ' ἄλλ'
αὐτῶν ἔχει αὐλόν. οὐ γὰρ ῥάδιον οὗτ' ἐνυδρον
θεῖναι μόνον τούτων ἕκαστον οὔτε πεζόν, εἰ πεζὰ
μὲν τὰ δεχόμενα τὸν ἀέρα θετέον, τὰ δὲ τὸ ὕδωρ
5 ἐνυδρα τὴν φύσιν. ἀμφοτέρων γὰρ μετείληφεν.
καὶ γὰρ τὴν θάλατταν δέχεται, καὶ ἀφίησι κατὰ
τὸν αὐλόν, καὶ τὸν ἀέρα τῷ πνεύμονι. τοῦτο γὰρ
ἔχουσι τὸ μόριον καὶ ἀναπνεύουσιν· διὸ καὶ λαμ-
βανόμενος ὁ δελφὶς ἐν τοῖς δικτύοις ἀποπνίγεται
ταχέως διὰ τὸ μὴ ἀναπνεῖν. καὶ ἔξω δὲ ζῇ
10 πολὺν χρόνον μύζων καὶ στένων, ὥσπερ καὶ τὰ
ἄλλα τῶν ἀναπνεόντων ζώων· ἔτι δὲ καθεύδων
ὑπερέχει τὸ ῥύγχος ὅπως ἀναπνέη. τὰ δ' αὐτὰ
τάττειν εἰς ἀμφοτέρας τὰς διαιρέσεις ἄτοπον
ὑπεναντίας² οὕσας· ἀλλ' εἴκειν εἶναι τὸ ἐνυδρον
ἔτι προσδιοριστέον. τὰ μὲν γὰρ δέχεται τὸ ὕδωρ
15 καὶ ἀφίησι διὰ τὴν αὐτὴν αἰτίαν δι' ἣν περ τὰ
ἀναπνέοντα τὸν ἀέρα, καταψύξεως χάριν, τὰ δὲ
διὰ τὴν τροφήν· ἀνάγκη γὰρ ἐν ὑγρῷ λαμβά-

¹ τῶν τοιούτων β γ Ald.: τοιούτων α Cs. Bk.

² ὑπεναντίους α γ (exc. L^c) Bk.

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But the oddest^a condition of all animals is that of the dolphin and any other of those that are similar among both the water animals and the other cetaceans that have this character, such as the whale and all others with a blow-hole. For it is not easy to class each of these either as solely water animal or as land animal, if one is to class those that take in air as land animals and those that take in water as water animals by nature. For they have a share in both: for they take in sea water, and discharge it by the blow-hole, and they take in air by their lungs. For they possess this part and breathe. That is why, when caught in the nets, the dolphin quickly suffocates for lack of breathing. Also, out of the water it lives a long time, murmuring and groaning, like the other animals that breathe^b; moreover, when asleep it holds its snout above water so as to breathe. But to place the same things in both the divisions, when they are contrary to each other, is absurd; it seems rather that a further distinction must be drawn in water-animals. For while some take in the water and discharge it for the same cause as those that breathe the air, for cooling, others do it because of their feeding: for they must get this in water and

^a The oddity is that they take in both air and water: see note at 589a10.

^b Voice is a sign that they have lungs, IV 535a30, 536a2.

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νειν¹ ταύτην καὶ τὸ ὑγρὸν ἅμα δέχεσθαι, καὶ τὸ
 δεχόμενον² ὄργανον ἔχει³ ὥς ἐκπέμψει. τὰ μὲν
 οὖν ἀνάλογον τῇ ἀναπνοῇ χρώμενα τῷ ὑγρῷ
 βράγχια ἔχει, τὰ δὲ διὰ τὴν τροφήν αὐτὸν τῶν
 20 ἐναίμων ζώων. ὁμοίως δὲ τὰ τε μαλάκια καὶ τὰ
 μαλακόστρακα· καὶ γὰρ ταῦτα δέχεται τὸ ὑγρὸν
 διὰ τὴν τροφήν.

ἔνυδρα δ' ἐστὶ τὸν ἕτερον τρόπον, διὰ τὴν τοῦ
 σώματος κρᾶσιν καὶ τὸν βίον, ὅσα δέχεται μὲν
 τὸν αἶρα ζῆ δ' ἐν τῷ ὑγρῷ, ἥ ὅσα δέχεται μὲν τὸ
 25 ὑγρὸν καὶ ἔχει βράγχια, πορεύεται δ' εἰς τὸ
 ξηρὸν καὶ λαμβάνει τροφήν. ἐν δὲ μόνον νῦν
 ὥπται τοιοῦτον, ὁ καλούμενος κορδύλος· οὗτος
 γὰρ πνεύμονα⁴ μὲν οὐκ ἔχει ἀλλὰ βράγχια,
 τετράπουν δ' ἐστὶν ὥς καὶ πεζεύειν πεφυκός.
 τούτων δὲ πάντων ἔοικεν ἡ φύσις ὥσπερ⁵ διε-

¹ β γ Ald.: -οντα α Cs. Bk.

² τὸ δεχόμενον β L^crec. Ald.: δεχόμενον α γ: δεχόμεναι C^a:
 suscipiens Guil.: δεχόμενα conl. Cs. Bk.

³ β P: ἔχειν α γ Guil. Ald. Bk.

⁴ πλεύμονα Bk. (ut semper)

⁵ ὥσπερανεί A^arec. F^a X^c γ Ald. Bk.: ὥσπερ ἀεί C^a A^apr.
 G^apr.: ὥσπερ G^arec. Q

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must take in the water at the same time, and the animal that takes it in has an organ by which it will eject it. Now those that use the water analogously to breathing have gills, while those blooded animals that take it in through feeding have a blow-hole. And similarly both the cephalopods and the crustaceans: for these too take in water because of their feeding.^a

Those that are water animals in the second way, that is, because of their bodily blend and their life, include all that take in the air but live in the wet, or^b take in the wet and possess gills but go on to the dry and get food (only one such has been seen at present, the so-called cordylus: for this, although it has not lungs but gills, is four-footed as being in fact naturally terrestrial). The nature of all these seems

^a See the fuller account at *Resp.* 476b13–477a10. For the blow-hole in cephalopods, IV 524a10; for crustaceans discharging water, IV 526b18, 527b17, PA IV 684a19. Both the actual process in crustaceans and Arist.'s account of it are well explained by W. Ogle, *Aristotle on Youth and Old Age* (Longmans 1897), note 121.

^b 589b24–28 ἡ ὅσα . . . πεφυκός looks like a later addition. It does not exemplify the second sense of aquatic, but the second sense of terrestrial, so contradicting 589a22 where he said that no animals take in water but live on land (cf. I 487b2). Otherwise he reports the cordylus as a fish having gills and feet (*Resp.* 476a6, PA IV 695b25, cf. HA I 490a4), but does not report that it gets food on land. (Th. suggests that it was actually a triton or newt at an intermediate stage.)

- 30 στράφθαι, καθάπερ τῶν τ' ἄρρένων ἕνια γίνεται
 θηλυκὰ καὶ τῶν θηλέων ἀρρενωπά. ἐν μικροῖς
 γὰρ μορίοις λαμβάνοντα τὰ ζῶα διαφορὰν μέγα
 διαφέρειν φαίνονται κατὰ τὴν τοῦ ὅλου σώματος
 590a φύσιν. δηλοῖ δ' ἐπὶ τῶν ἐκτεμνομένων· μικροῦ
 γὰρ μορίου πηρωθέντος εἰς τὸ θῆλυ μεταβάλλει
 τὸ ζῶον, ὥστε δηλὸν ὅτι καὶ ἐν τῇ ἐξ ἀρχῆς
 συστάσει ἀκαριαίου τινὸς μεταβάλλοντος τῷ
 μεγέθει, ἐὰν ᾗ ἀρχοειδές, γίνεται τὸ μὲν θῆλυ τὸ
 5 δ' ἄρρεν, ὅλως δ' ἀναιρεθέντος οὐδέτερον. ὥστε
 καὶ τὸ πεζὸν καὶ ἔνυδρον¹ εἶναι κατ' ἀμφοτέρους
 τοὺς τρόπους ἐν μικροῖς μορίοις γινομένης τῆς
 μεταβολῆς συμβαίνει γίνεσθαι τὰ μὲν πεζὰ τὰ δ'
 ἔνυδρα τῶν ζώων. καὶ τὰ μὲν οὐκ ἐπαμφοτερίζει
 τὰ δ' ἐπαμφοτερίζει διὰ τὸ μετέχειν τι τῆς ὕλης
 10 ἐν τῇ συστάσει τῆς γενέσεως ἐξ οἷας ποιεῖται
 τὴν τροφήν· προσφιλές γὰρ ἐκάστω τῶν ζώων
 τὸ κατὰ φύσιν, ὥσπερ εἴρηται καὶ πρότερον.
 διηρημένων δὲ τῶν ζώων εἰς τὸ ἔνυδρον καὶ
 πεζὸν τριχῶς, τῷ τε² δέχεσθαι τὸν ἀέρα ἢ τὸ

¹ τὸ ἔνυδρον α Bk. Dt.

² τῷ τε α: τὸ β E^a P M^c n: τῷ K^c L^c m Ald. Bk.

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as though it has been distorted, just as some males become feminine in appearance and some females masculine-looking. For through undergoing a change in small parts animals appear to have a major difference in their whole bodily nature. It shows in the case of castrated animals: for after a small part has been mutilated the animal changes over towards the female; so that it is clear that in the animal's original constitution too if some tiny part changes, provided that it is an originative kind of part,^a one becomes female and another male, and if it is wholly destroyed the animal becomes neither. Hence to be terrestrial and aquatic, in both of the ways, results from the change that occurs in small parts so that some animals turn out to be terrestrial and others aquatic. And some do not tend to both sides, while others do, because in their constitution when they are being formed they partake to some extent of matter such as provides their food; for each animal likes what accords with its nature, as we have said before.^b And since the animals have been divided into aquatic and terrestrial triply^c—by

^a A source-type part (*ἀρχή*). Since the difference between land and water animals is due to their original constitution, which consisted of minute parts, Arist. needs to show that a change occurring in a minute part can originate a major change throughout the animal. Cf. *GA* I 716b3, IV 766a24, V 788a12, Theophrastus *CP* III 17.7, and Peck's note 58 in Vol. I, p. lxxxvii.

^b 589a8.

^c By three 'cuts' (*Met. Z.* 1038a28); cf. 589a11 note.

- 15 ὕδωρ, καὶ τῇ κράσει τῶν σωμάτων, τὸ δὲ τρίτον
ταῖς τροφαῖς, ἀκολουθοῦσιν οἱ βίοι κατὰ ταύτας
τὰς διαιρέσεις· τὰ μὲν γὰρ κατὰ τὴν κρᾶσιν καὶ
τὴν τροφήν ἀκολουθοῦσι καὶ κατὰ τὸ δέχεσθαι τὸ
ὕδωρ ἢ τὸν ἀέρα, τὰ δὲ τῇ κράσει καὶ τοῖς βίοις
μόνον.

- τῶν μὲν οὖν ὀστρακοδέρμων ζώων τὰ μὲν
20 ἀκίνητίζοντα τρέφεται τῷ ποτίμῳ· διηθεῖται γὰρ
διὰ τῶν πυκνῶν διὰ τὸ λεπτότερον εἶναι τῆς
θαλάττης συμπεττομένης, ὥσπερ καὶ τὴν ἐξ
ὑπαρχῆς λαμβάνει γενέσιν. ὅτι δ' ἐν τῇ
θαλάττῃ πότιμόν ἐστι¹ καὶ ταύτῃ² διηθεῖσθαι
δύναται φανερόν ἐστιν· ἥδη γὰρ εἰληφέναι τού-
του συμβέβηκέ τισι³ πείραν. ἐὰν γάρ τις κήρινον
25 πλάσας λεπτὸν ἀγγεῖον καὶ περιδήσας καθῆ ἑῖς
τὴν θάλατταν κενόν, ἐν νυκτὶ καὶ ἡμέρᾳ λαμβάνει

¹ ἔνεστι α Bk.

² τοῦτο α Cs. Bk.

³ τισι om. α Cs. Bk.

^a See Peck's note, Vol. I, p. lxxv. "Blend" and "feeding"

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taking in air or water, and by their bodily blend,^a and thirdly by their feeding—their lives follow in accordance with these divisions. For some animals follow in accordance with blend and feeding and in accordance with taking water or air, while the others follow in virtue of blend and lives alone.

Now among the testacean animals those that are unmoving are nourished by the drinkable water (for it filters through the dense parts because it is finer than the sea water when that is being concocted) just as they also derive their original generation.^b That there is drinking water in the sea and that it can be filtered by this way is evident: for some have made a successful test of it. For if one moulds a thin vessel of wax, ties a cord round, and lets it down empty into the sea, in the space of a night and day it fills up with water, and this is shown to be must coincide, and must agree with environment; hence the three cuts yield only two divisions, (i) those that follow blend, feeding and taking-in, (ii) those that follow blend and feeding alone. Division (ii) comprises those that take in either the other element (air) or nothing at all, i.e. amphibians and the bloodless. Cf. notes at 589a10, 11.

^b For the generating of testaceans see GA III 11. They are mostly produced in sea water rather than in fresh, because the sea contains more solids and warmth (761b1); but they also need sweet rain water to nourish the new animal (762a12); meanwhile the earthy sea water is being concocted by heat to form the animal's solid parts (762a30).

ὕδατος πλήθος καὶ τοῦτο φαίνεται πότιμον.

αἱ δ' ἀκαλήφαι τρέφονται ὅ τι ἂν προσπέσῃ
 ἰχθυόδιον. ἔχει δὲ τὸ στόμα ἐν μέσῳ· δηλὸν δὲ
 τοῦτο μάλιστ' ἐστὶν ἐπὶ τῶν μεγάλων. ἔχει δ'
 30 ὥσπερ τὰ ὄστρεα, ἥ ὑποχωρεῖ ἔξω ἢ τροφή, πόρον.
 ἐστὶ δ' αὐτὸς¹ ἄνω· ἔοικε γὰρ ἡ ἀκαλήφη ὥσπερ
 τὸ ἔσω εἶναι τῶν ὀστρέων τὸ σαρκῶδες, τῇ δὲ
 πέτρᾳ χρῆσθαι ὡς ὀστρέῳ. καὶ αἱ λεπάδες δ'
 ἀπολυόμεναι μεταχωροῦσι καὶ τρέφονται.

590b ὅσα δὲ κινητικά, τὰ μὲν ζωοφαγοῦντα τρέφεται
 τοῖς μικροῖς ἰχθυοῖς, οἷον ἡ πορφύρα· σαρκο-
 φάγον γὰρ ἐστὶ, διὸ καὶ δελεάζεται τοῖς τοιού-
 τοις· τὰ δὲ καὶ τοῖς ἐν τῇ θαλάττῃ φυομένοις.

αἱ δὲ χελῶναι αἱ θαλάττιαι τὰ τε κογχύλια
 5 νέμονται (ἔχουσι γὰρ τὸ στόμα ἰσχυρότατον² πάν-
 των· ὅτου γὰρ ἂν ἐπιλάβηται, ἢ λίθου ἢ ἄλλου
 ὀτουοῦν, ἀπεσθίει καὶ κατὰγνυσιν), καὶ ἐξιοῦσα

¹ αὐτὸς β γ Ald.: οὗτος αἶνος C^a: οὕτως A^{ap}r.: οἷτος G^a Q
 Bk.

² -τερον γ Ald. Bk.

^a That fishes are nourished by the sweet water in the sea was a common theory, held also by Empedocles, Democritus and Theophrastus (Aelian IX 64, Thphr. CP VI 10. 2). But the test with the wax vessel is not reported before Arist. Unhappily it does not work with wax, though it does

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drinkable.^a

The sea-anemones feed on any small fish that falls upon them. They have the mouth in the centre; this is seen most clearly in the large ones. They have also, like the shellfishes, a passage whereby the food is excreted out.^b The passage itself is above; for the sea-anemone seems to be like the shellfish's inner part, which is fleshy, and to use the rock as a shell. Further, the limpets detach themselves and go about and feed.

Among the mobile testaceans some are animal-eating and feed on the small fishes, as the purpura does: for it is flesh-eating, and is therefore caught by such bait. The others feed on the plants growing in the sea.

The sea tortoises not only feed on shellfishes (for they have the strongest of mouths: whatever it takes hold of, whether stone or anything else, it bites it off and shatters it), but also come out and

with raw unglazed earthenware, as Albertus comments here (Stadler 502.21), cf. *GA* II 743a10. Ogle therefore proposed reading *κεράμινον* for *κήρινον*; but Arist. gives the same account at *Meteor.* II 358b35, and it is repeated by Aelian l.c. and Pliny XXXI 37. 70 (the latter account apparently independent of Arist.). See H. Diels in *Hermes* XL (1905) 310.

^b The statement that it excretes food is thought by some editors to conflict with IV 531b9 and *PA* IV 681b7. Th. suggested that there is a confusion here with the ascidian's two orifices (IV 531a12, *PA* IV 681a29). This may however be simply a false observation.

τὴν πῶαν νέμεται. πονοῦσι δὲ καὶ ἀπόλλυνται
πολλάκις ὅταν ἐπιπολάζουσαι ὑπερξηρανθῶσιν¹
ὑπὸ τοῦ ἡλίου· καταφέρεσθαι γὰρ οὐ δύνανται
πάλιν² ῥαδίως.

- 10 τὸν αὐτὸν δὲ τρόπον καὶ τὰ μαλακόστρακα·
καὶ γὰρ ταῦτα παμφάγα· καὶ γὰρ λίθους καὶ
ὑλὴν³ καὶ φυκία νέμονται καὶ κόπρον, οἷον οἱ
πετραῖοι τῶν καρκίνων, καὶ σαρκοφαγοῦσιν. οἱ δὲ
κάραβοι κρατοῦσι μὲν καὶ τῶν μεγάλων ἰχθύων,
καὶ τις συμβαίνει περιπέτεια τούτων ἐνίοις· τοὺς
15 μὲν γὰρ καράβους οἱ πολύποδες κρατοῦσιν, ὥστε
κἂν ὄντας πλησίον ἐν ταύτῳ δικτύῳ αἰσθωνται
ἀποθνήσκουσιν οἱ κάραβοι διὰ τὸν φόβον· οἱ δὲ
κάραβοι τοὺς γόγγρους· διὰ γὰρ τὴν τραχύτητα
οὐκ ἐξολισθαίνουσιν αὐτῶν· οἱ δὲ γόγγροι τοὺς
πολύποδας κατεσθλίουσιν· οὐδὲν γὰρ αὐτοῖς διὰ
20 τὴν λειότητα δύνανται χρῆσθαι. τὰ δὲ μαλάκια
πάντα σαρκοφάγα ἐστίν. νέμονται δ' οἱ κάραβοι
τὰ ἰχθύδια θηρεύοντες παρὰ τὰς θαλάμας· καὶ
γὰρ ἐν τοῖς πελάγεσιν ἐν τοῖς τοιούτοις γίνονται
τόποις οἱ⁴ ἂν ᾧσι τραχεῖς καὶ λιθώδεις· ἐν τοῖς
τοιούτοις⁵ γὰρ ποιοῦνται⁶ τὰς θαλάμας· ὅ τι δ'

¹ ξηρανθῶσιν a Bk.

² πάλιν ante οὐ δυν. transp. a Bk.

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feed on the grass. They suffer and often die when they are on the surface and become too dried by the sun; for they cannot easily submerge themselves again.

It is the same with the crustaceans, for they too are omnivorous: they feed on stones and wood and sea weeds and dung (e.g. the rock crabs), and they are flesh-eating. The crayfishes even overcome the big fishes, and a sort of dramatic reversal befalls some of these animals. For the octopuses overcome the crayfishes, so that if the crayfishes even sense them near in the same net they die of fear. The crayfishes overcome the conger eels, which do not slip away from them because of their rough surface. But the conger eels eat the octopuses, which cannot deal with them because of their smoothness. (The cephalopods are all flesh-eaters.)^a The crayfishes feed on the small fishes which they hunt beside their hiding places; for they occur out to sea in such places as are rough and stony; it is in such places that they make their lairs for themselves. What-

^a This statement is transposed to 590b32 by some edd. and deleted by others; but it is relevant here, explaining their attack on crayfish.

³ β γ Ald.: λὺν α Bk.: *fecem* Guil.: *limum* Gaza

⁴ οἱ α Bk.: οἶον T^c n

⁵ τοῖς τοιοῦτοις] τοῦτοις α Bk.

⁶ ποιοῦνται καὶ α Bk.

- 25 ἂν λάβῃ προσάγεται πρὸς τὸ στόμα τῇ δικρόᾳ
 χηλῇ καθάπερ οἱ καρκίνοι. βαδίζει δὲ κατὰ
 φύσιν μὲν εἰς τὸ πρόσθεν¹ ὅταν ἄφοβος ᾖ, κατα-
 βάλλων² τὰ κέρατα πλάγια· ὅταν δὲ φοβηθῇ
 φεύγει ἀνάπαλιν καὶ μακρὰν ἐξακοντίζει.
 μάχονται δὲ πρὸς ἀλλήλους ὥσπερ οἱ κριοὶ τοῖς
 30 κέρασιν, ἐξαίροντες καὶ τύπτοντες. ὁρῶνται δὲ
 μετ' ἀλλήλων πολλάκις³ καὶ ἀθρόοι ὥσπερ ἀγέλη.
 τὰ μὲν οὖν μαλακόστρακα τοῦτον ζῇ τὸν τρόπον.

τῶν δὲ μαλακίων αἱ τευθίδες καὶ αἱ σηπῖαι
 591a κρατοῦσι καὶ τῶν μεγάλων ἰχθύων. οἱ δὲ πολύπο-
 δες μάλιστα κογχύλια συλλέγοντες, ἐξαίροντες⁴
 τὰ σαρκία τρέφονται τούτοις· διὸ καὶ τοῖς ὀστρά-
 κοις οἱ θηρεύοντες γνωρίζουσι τὰς θαλάμας
 αὐτῶν. ὃ δὲ λέγουσί τινες ὡς αὐτὸς αὐτὸν ἐσθλεί
 5 ψεῦδός ἐστιν· ἀλλὰ περιεδηδεσμένος⁵ ἔχουσιν
 ἔνιοι τὰς πλεκτάνας ὑπὸ τῶν γόγγρων.

οἱ δ' ἰχθύες τοῖς μὲν κυήμασι τρέφονται
 πάντες ὅταν οἱ χρόνοι καθήκωσιν οὔτοι, τὴν δ'

¹ τοῦμπροσθεν *a* Bk. ² -βαλὼν *C^a* Bk. Dt.

³ πολλάκις post ἀθρόοι transp. *a* Bk.

⁴ ἐξαιροῦντες *a* edd.

⁵ ἀλλὰ περιεδηδεσμένος *β* *L^crec.* Ald.: ἀλλ' ἀπεδηδεσμένος *C^a*
A^apr. *G^a* *Q* Bk.: ἀλλ' ἐπεδηδεσμένος *A^arec.* *F^a* *X^c* *L^cpr.* n: ἀλλὰ

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ever the crayfish takes, it brings up to its mouth with its double claw, like the crabs. Its natural walk is towards its front when it is not frightened, with its horns^a hanging down at the sides; but when it has been frightened it flees backwards and shoots its horns forwards from a distance. They fight each other like rams with their horns, raising them and striking. They are often seen with each other, even collected together like a herd. That then is the way the crustaceans live.

Among the cephalopods, the teuthides and the cuttlefishes overcome even the big fishes. The octopuses collect shellfishes especially, take out the fleshy parts and feed on these; hence the fishermen recognise their lairs by the shells. The report that the octopus eats itself^b is false; but some of them have their tentacles nibbled by the conger eels.

The fishes all feed on the spawn^c when the times for this come round, but the rest of their food is not

^a Antennae, cf. IV 526a6, 31.

^b Albertus 504.24 followed by Th. takes this to mean "devours its own species" (which *Loligo* does). But Hesiod WD 524, repeated by Antig. Caryst. XXI (25), makes the octopus eat its own "feet": it seems indeed that Hesiod was right and Arist. over-sceptical. See T. F. Higham, CR 7 (1957), 16.

^c Cf. GA III 756b4, Herodotus II 93. 2.

πέδη δεσμίας E^a Ppr. (incert. Prec.): ἀλλ' ἐπεδηδεμένας m:
ἀλλ' ἀπεδηδεμένας K^c M^c

- ἄλλην τροφήν οὐ τὴν αὐτὴν ποιοῦνται πάντες.
 10 οἱ μὲν γὰρ αὐτῶν εἰσι σαρκοφάγοι μόνον, οἷον τὰ
 τε σελάχη καὶ οἱ γόγγροι καὶ αἱ χάνναι καὶ οἱ
 θύννοι καὶ λάβρακες καὶ σινόδοντες καὶ ἁμῖαι καὶ
 ὀρφοὶ καὶ μύραιναι· αἱ δὲ τρίγλαι¹ φυκίοις τρέ-
 φονται καὶ ὀστρέοις καὶ βορβόρῳ καὶ σαρκοφα-
 γοῦσιν·² ὁ δὲ δάσκιλλος τῷ βορβόρῳ καὶ κόπρῳ,
 15 σκάρος δὲ καὶ μελάνουρος φυκίοις, ἡ δὲ σάλπη
 τῇ κόπρῳ καὶ φυκίοις· βόσκεται δὲ καὶ τὸ πρά-
 σιον, θηρεύεται δὲ καὶ κολοκύντη³ μόνῃ τῶν
 ἰχθύων. ἀλληλοφαγοῦσι δὲ πάντες μὲν πλὴν
 κεστρέως, μάλιστα δ' οἱ γόγγροι.

- ὁ δὲ κέφαλος καὶ ὁ κεστρεὺς ὅλως μόνοι οὐ
 20 σαρκοφαγοῦσιν· σημεῖον δέ, οὔτε γὰρ ἐν τῇ κοιλίᾳ
 πότ'⁴ ἔχοντες εἰλημμένοι εἰσὶ τοιοῦτον οὐδέν,
 οὔτε δελέατι χρῶνται ζώων σαρκίν⁵ πρὸς αὐτοὺς
 ἀλλὰ μάζῃ. τρέφεται δὲ πᾶς κεστρεὺς φύκει⁶
 καὶ ἄμμῳ. ἔστι δ' ὁ μὲν κέφαλος ὄν καλοῦσί

¹ τρίγ. καὶ a Bk.

² post σαρκ. add. κέφαλοι δὲ τῷ βορβόρῳ a mrec. Gaza edd.

³ κολοκύνθη a edd.

⁴ πώποτ' a Bk.

⁵ ζω. σα. post αὐτοὺς transp. a Bk.

⁶ L^c Ald.: φυκίοις a Bk.: φύκη cett.

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the same for all. For some of them are carnivorous only, e.g. the selachians, congers, channa, tunny, basse, synodon, bonito, sea-perch, muraena. The red mullet feeds on sea-weeds and shellfish and mud as well as on flesh^a; the daskillos on mud and dung, the parrot-wrasse and melanurus on sea-weeds, the saupe on dung and sea-weeds—it feeds also on the prasion^b and is the only fish caught with a gourd.^c All except the grey mullet eat each other,^d especially the congers.

The cephalus and the grey mullet are the only fishes that eat no flesh at all.^e Evidence of this is that they have never been taken with anything of this kind in the stomach, and that the bait used for them is not animal flesh but barley bread. Every grey mullet feeds on sea-weed and sand. The cephalus which some call chelon is inshore, but the

^a Against this, VIII(IX) 621b7 reports it as non-carnivorous.

^b Prasion or brasion is otherwise known only as the land plant *Marrubium* (horehound). Gaza followed by some edd. conjectured prason (*Zostera*), a sea weed reported by Thphr. *HP* IV 6. 2.

^c Th. suggests this may be a confusion with sea-perch (orphos) for which according to Apostolides 46 they used saupe as the bait with a floating gourd attached.

^d Including their own kind, cf. 593b27.

^e But *PA* IV 697a2 implies that all saw-toothed are carnivorous. On the other hand VIII(IX) 621b7 gives others too as non-carnivorous exceptions (grey mullet, saupe, red mullet, chalkides).

- τινες χελῶνα πρόσγειος, ὁ δὲ περαίας οὐ· βόσκει-
 25 ται δ' ὁ περαίας τὴν ἀφ' αὐτοῦ μύξαν, διὸ καὶ
 νῆστis ἐστίν αἰεί. οἱ δὲ κέφαλοι νέμονται τὴν
 ἰλύν, διὸ καὶ βαρεῖς καὶ βλεννώδεις εἰσίν, ἰχθύν
 δ' ὅλως οὐκ ἐσθίουσιν· διὰ τε τὸ ἐν τῇ ἰλύϊ δια-
 τρίβειν ἐξανακολυμβῶσι πολλάκις ἵνα περιπλύ-
 νωνται τὸ βλέννος. τὸν δὲ γόνον αὐτῶν οὐδὲν
 ἐσθίει τῶν θηρίων, διὸ γίνονται πολλοί· ἀλλ'
 30 ὅταν αὐξηθῶσι, τότε κατεσθίονται ὑπὸ τε τῶν
 591b ἄλλων ἰχθύων καὶ μάλιστα ὑπὸ τοῦ ἀρχάρνου.¹
 λαίμαργος δὲ μάλιστα τῶν ἰχθύων ἐστίν² ὁ κεσ-
 τρεὺς καὶ ἄπληστος, διὸ ἡ κοιλία περιτείνεται,
 καὶ ὅταν μὲν³ ᾖ νῆστις, φαῦλος· ὅταν δὲ φοβηθῇ
 κρύπτει τὴν κεφαλὴν ὥς ὅλον τὸ σῶμα κρύπτων.
 5 σαρκοφαγεῖ δὲ καὶ ὁ σινόδων καὶ τὰ μαλάκια
 κατεσθίει. πολλάκις δὲ καὶ οὗτος καὶ ἡ χάννη⁴
 ἐκβάλλουσι τὰς κοιλίας διώκοντες τοὺς ἐλάττους
 ἰχθύας⁵ διὰ τὸ πρὸς τῷ στόματι τὰς κοιλίας τῶν
 ἰχθύων εἶναι καὶ στόμαχον μὴ ἔχειν.

¹ β γ: ἀχάρνου m edd.: ἀρχάνου O^c T^c Gaza Ald.: ἀθαρίνου a Guil.

² ἐστίν post ὁ κεστρεὺς transp. a Bk.

³ μὲν ἡ β: ἡ μὲν γ Ald. Scal.: ἡ μὴ a mrec. Scot. Guil. Gaza edd.

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peraias is not; the peraias feeds on its own mucous discharge, hence it is always starved. The cephalus feed on the mud, hence they are heavy and slimy; they eat no fish at all. Because they live in the mud they frequently leap up out of it to wash off the slime. Their spawn is not eaten by any creature, hence they occur in large numbers; but when grown, then they are eaten by the other fishes and especially by the archarnas. The grey mullet is the greediest and most insatiable of the fishes, hence its stomach is distended and when it is^a starved it is in poor condition. When frightened, it hides its head thinking that it is hiding its whole body.

The synodon too is carnivorous and eats the cephalopods. Often both it and the channa extrude their stomachs^b while chasing the smaller fishes, because the stomachs of fishes are next to the mouth and they have no gullet.

^a See app. crit. Scal. followed the Aldine in omitting the negative, but commented that the Venetians of his time preferred the mullet starving and considered it in poor condition when not empty. Either reading is therefore defensible.

^b Cf. II 507a29; it is in fact the swim-bladder that is extruded.

⁴ *χάρνα* α Bk.

⁵ *ἰχθυὶς* α Bk.

τὰ μὲν οὖν, ὥσπερ εἴρηται, σαρκοφάγα μόνον
 10 ἐστίν, οἷον δελφῖς καὶ σινόδων καὶ χρύσοφρυς καὶ
 οἱ σελαχῶδεις τῶν ἰχθύων καὶ τὰ μαλάκια· τὰ δ'
 ὥς ἐπὶ τὸ πολὺ νέμονται μὲν τὸν πηλὸν καὶ τὸ
 φῦκος καὶ τὸ βρύον καὶ τὸ καλούμενον καυλίον
 καὶ τὴν φυομένην ὕλην, οἷον φυκῖς καὶ κωβιδὸς
 καὶ οἱ πετραῖοι· ἡ δὲ φυκῖς ἄλλης μὲν σαρκὸς
 15 οὐχ ἄπτεται, τῶν δὲ καρίδων. πολλάκις δὲ καὶ
 ἀλλήλων ἄπτονται, καθάπερ εἴρηται, καὶ τῶν
 ἐλαττόνων οἱ μείζους. σημεῖον δ' ὅτι σαρκοφα-
 γοῦσιν· ἀλίσκονται γὰρ τοιούτοις δελέασιν. καὶ
 ἁμία δὲ καὶ θυννὶς καὶ λάβραξ τὰ μὲν πολλὰ
 σαρκοφαγοῦσιν, ἄπτονται δὲ καὶ φυκίων. ὁ δὲ
 σάργος ἐπινέμεται τὴν τρίγλαν,¹ καὶ ὅταν ἡ
 20 τρίγλη κινήσασα τὸν πηλὸν ἀπέλθῃ (δύναται
 γὰρ ὀρύττειν), ἐπικαταβὰς νέμεται καὶ τοὺς
 ἀσθενεστέρους ἑαυτοῦ κωλύει συνεπιβαίνειν.

δοκεῖ δὲ τῶν ἰχθύων καὶ² ὁ καλούμενος σκάρος
 μηρυκάζειν ὥσπερ τὰ τετράποδα μόνος.

τοῖς μὲν οὖν ἄλλοις ἰχθύσιν ἡ θήρα τῶν ἡττό-
 νων καταντικρὺ γίνεται τοῖς στόμασιν, ὥνπερ
 25 πεφύκασι τρόπον νεῖν· οἱ δὲ σελαχῶδεις καὶ οἱ
 δελφῖνες καὶ πάντες οἱ κητώδεις ὑπτιοὶ ἀνα-

¹ τῇ τρίγλῃ α Sn. Bk.

² καὶ om. α Guil. Gaza Sn. Bk.

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Now some, as we have said,^a are carnivorous only, for example dolphin, synodon, gilthead, and the selachian fishes and the cephalopods. Others usually feed on mud and sea-weed and oyster-green and what is called quillweed and the plant growth, for example phykis and goby and the rock-fishes; but the phykis, though it does not touch other flesh, takes the carids. Often, however, they also take each other, as we have said,^b the larger ones in fact taking the smaller. Evidence of their flesh-eating is the fact that they are caught with that kind of bait. The bonito too and tunny and basse are mostly flesh-eating but also take sea-weeds.^c The sargue encroaches on the red mullet, and when the red mullet has stirred up the mud (for it can dig) and has gone away the sargue comes down and feeds, and prevents those weaker than itself from coming down there too.

The fish called parrot-wrasse is actually thought to be the only one that ruminates like the quadrupeds.

Now the other fishes catch the smaller ones straight ahead in their mouths, when in their natural swimming attitude. But the selachians and dolphins and all cetaceans turn over on their backs

^a 591a9.

^b 591a17.

^c 591b18 thus corrects 591a11.

πίπτοντες λαμβάνουσιν· κάτω γὰρ τὸ στόμα
 ἔχουσιν. διὸ σώζονται μᾶλλον οἱ ἐλάττους· εἰ δὲ
 μή, πάνπαν ἂν δοκοῦσιν¹ ὀλίγοι εἶναι· καὶ γὰρ ἡ
 τοῦ δελφίνος ὀξύτης καὶ δύναμις τοῦ φαγεῖν
 30 δοκεῖ εἶναι θαυμαστή.

τῶν δ' ἐγχελέων² τρέφονται μὲν ὀλίγαι³ τινες
 592a καὶ ἐνιαχοῦ καὶ τῇ ἱλύϊ καὶ σιτίοις ἐὰν τις παρα-
 βάλλῃ, αἱ μέντοι πλείους τῷ ποτίμῳ ὕδατι· καὶ
 τοῦτο τηροῦσιν οἱ ἐγχελεοτρόφοι⁴ ὅπως ὅτι μάλι-
 στα καθαρὸν ἦ, ἀπορρέον αἰεὶ καὶ ἐπιρρέον ἐπὶ
 πλαταμώνων, ἢ κονιῶντες⁵ τοὺς ἐγχελεῶνας.
 5 ἀποπνίγονται γὰρ ταχὺ ἐὰν μὴ καθαρὸν ἦ τὸ

¹ δοκ. post ὀλίγ. transp. α Bk.

² ἐγχελέων α γ (exc. K^c M^c) Bk.

³ ὀλίγ. μὲν transp. α γ (exc. L^c m n) Bk.

⁴ ἐγχελεοτρόφοι α: ἐγχελυοτρόφοι E^a P Bk.

⁵ C^a A^{apr}. G^a Q β Dt.: κονιῶνται A^a rec. F^a X^c L^c m n Ald.
 Bk.: κονιῶν τε E^a P K^c M^c: puluerizentur Guil.: pulueru-
 lentes Trap.: extruunt Gaza

^a Cf. the similar account at PA IV 696b24. This strange mis-description of the dolphin, which was so familiar in art as well as in life, has made edd. suggest deleting it, but it seems well embedded in the context. It is repeated by Pliny IX 7. 20, who goes so far as to say that the dolphin's mouth is "far below the snout, almost in the middle of its belly". The teleological implication has been questioned, because both here and elsewhere HA has been

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to take them; for their mouth is below.^a Hence the smaller fishes tend more to survive: otherwise it is thought there would be few altogether, for the dolphin's quickness and voracity seem to be astonishing.

Of the eels, although some few — and in certain places — feed both on mud and on random food scraps thrown to them, the majority feed on drinkable water. And the eel-farmers look after this, that it should be as clean as possible, always flowing away and flowing in over flat stones, or else they plaster the eel-tanks. For they quickly suffo-

thought to weaken Arist.'s position. But this is not really so. Corresponding to 591b27, *PA* IV 696b27 says "nature seems to have arranged it so, not only to save the other animals . . . but to save these from killing themselves by over-eating; . . . and besides, the snout is too small to contain the mouth", which is probably a sarcastic rejection of popular teleology (the saving of other animals) and its replacement by a genuine advantage to these (the avoidance of over-eating). At 591b27 (which is clearly based on *PA* 696b27) the bare fact is stated without discussion of final causes. Equally at VI 567b2 the teleological statement of *GA* III 755a30 is replaced by a factual statement which appears like the obverse of the teleological argument but really says only that the destruction of excess spawn fits into a successful pattern of reproduction. See notes at VII(VIII) 595a16 and VIII(IX) 615a25, where Arist. is saying that nature has provided suitable organs and therefore the animal seeks the food that these organs enable it to get, and there is no contradiction between *HA* and the other treatises.

- ὕδωρ· ἔχουσι γὰρ τὰ βράγχια μικρά. διόπερ
 ὅταν θηρεύωσι ταραττοῦσι τὸ ὕδωρ· καὶ ἐν τῷ
 Στρυμόνι δὲ περὶ Πλειάδα¹ ἀλίσκονται· τότε γὰρ
 ἀναθολοῦται τὸ ὕδωρ καὶ ὁ πηλὸς ὑπὸ πνευμά-
 των γινομένων ἐναντίων· εἰ δὲ μή, συμφέρει
 10 ἡσυχίαν ἔχειν. ἀποθανοῦσαι δ' αἱ ἐγγέλεις² οὐκ
 ἐπιπολάζουσιν οὐδὲ φέρονται ἄνω ὥσπερ οἱ πλεῖ-
 στοι τῶν ἰχθύων· ἔχουσι γὰρ τὴν κοιλίαν μικράν.
 δημὸν δ' ὀλίγοι μὲν ἔχουσιν, αἱ δὲ πλείεσται οὐκ
 ἔχουσιν. ζῶσι δ' ἐκ τοῦ ὑγροῦ ἀφαιρούμεναι ἡμέ-
 ρας καὶ πέντε καὶ ἕξ, καὶ βορείων μὲν ὄντων
 15 πλείους νοτίων δ' ἐλάττους. καὶ μεταβαλλόμε-
 ναι τοῦ θέρους εἰς τοὺς ἐγγελεῶνας³ ἐκ τῶν
 λιμνῶν ἀποθνήσκουσι, χειμῶνος δ' οὔ. καὶ τὰς
 μεταβολὰς δ' οὐχ ὑπομένουσι τὰς ἰσχυράς, οἷον
 καὶ τοῖς φέρουσιν ἐὰν βάπτωσιν εἰς ψυχρόν·
 ἀπόλλυνται γὰρ ἀθρόαι πολλάκις. ἀποπνίγονται
 20 δὲ ἐὰν καὶ⁴ ἐν⁵ ὀλίγῳ ὕδατι τρέφονται. τὸ δ'
 αὐτὸ τοῦτο καὶ ἐπὶ τῶν ἄλλων συμβαίνει ἰχθύων·
 ἀποπνίγονται γὰρ ἐν τῷ αὐτῷ ὕδατι καὶ ὀλίγοι⁶
 αἰεῖ ὄντες, ὥσπερ καὶ τὰ ἀναπνέοντα ἐάνπερ πω-
 μασθῇ⁷ ὀλίγος ἀήρ. ζῶσι δ' ἐνταῖ ἐγγέλεις⁸ καὶ

¹ πλειάδας a Guil. Sn. Bk.² ἐγγέλως a Bk.³ ἐγγελεῶνας P mpr. Bk.⁴ καὶ ἐὰν transp. a Sn. Bk.

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cate if the water is not clean, because their gills are small. For this reason those fishing for eels disturb the water; and in the river Strymon eels are caught at the time of the Pleiad,^a for then the water and mud are made turbid by winds coming from the opposite direction; otherwise it is well to have it quiet. When eels have died they do not float on the surface nor even rise upwards like the majority of fishes; for their stomach is small, and though a few contain fat, most do not. When they are taken from the water they live up to five or six days, longer if the winds are northerly, less if southerly. And if they are moved in summer from the pools into the eel-tanks they die, but not in winter. Moreover they do not tolerate changes that are violent, such as happens even while they are being carried if they are plunged into cold water: for often whole batches are killed. They also suffocate if they are kept in a small amount of water. The same thing happens in the case of the other fishes: they suffocate if even a few are continuously in the same water, just as the breathing animals do if in fact there is little air and it is enclosed. Some eels live even seven or eight

^a The morning rising of the Pleiades in early May: see Vol. II, App. A p. 400.

⁵ ἐν β γ: ἐπ' α (exc. ὑπ' F^a X^c): om. Ald. Bk.

⁶ β γ Ald.: δλίγω α edd. ⁷ ἐὰν περιπωμασθῇ α Sylb. edd.

⁸ ἐγγέλως α Bk.: ἐγγελίδες E^a P K^c M^c: ἐγγέλως L^c m n Ald.

ἐπτά καὶ ὀκτὼ ἔτη.

τροφῇ δὲ καὶ οἱ ποτάμιοι χρῶνται ἀλλήλους τ'
 25 ἐσθλόντες καὶ βοτάνας καὶ ῥίζας κἄν τι ἐν τῷ
 βορβόρῳ λάβωσιν. νέμονται δὲ μᾶλλον τῆς
 νυκτός, τὴν δ' ἡμέραν εἰς τὰ βαθέα ὑποχωροῦσι.

τὰ μὲν οὖν περὶ τὴν τῶν ἰχθύων τροφήν τοῦτον
 ἔχει τὸν τρόπον.

III τῶν δ' ὀρνίθων ὅσοι μὲν γαμφώνυχοι¹ σαρκο-
 30 φάγοι πάντες εἰσὶ, σίτον δ' οὐδ' ἐάν τις ψωμίξῃ
 592b δύνανται καταπιεῖν, οἷον τὰ τε τῶν αἰετῶν γένη
 πάντα καὶ ἰκτῖνοι καὶ ἱέρακες ἄμφω, ὃ τε φαβο-
 τύπος καὶ ὁ σπιζίας (διαφέρουσι δ' τὸ μέγεθος
 οὗτοι² πολὺ ἀλλήλων) καὶ ὁ τριόρχης· ἔστι δ' ὁ
 τριόρχης τὸ μέγεθος ὅσον ἰκτίνος καὶ φαίνεται
 5 οὗτος διὰ παντός. ἔτι δὲ³ φήνη καὶ γύψ· ἔστι δ'
 ἡ μὲν φήνη τὸ μέγεθος αἰετοῦ μείζων, τὸ δὲ
 χρῶμα σποδοειδές· τῶν δὲ γυπῶν δύο ἐστὶν εἶδη,
 ὁ μὲν μικρὸς καὶ ἐκλευκότερος, ὁ δὲ μείζων καὶ
 σποδοειδέστερος. ἔτι τῶν νυκτερινῶν ἔνιοι γαμ-
 ψώνυχές εἰσιν, οἷον νυκτικόραξ, γλαύξ, βύας.⁴

¹ γαμφώνυχες a Bk.

² οὗτοι τὸ μέγ. transp. a Bk.

³ δὲ om. a γ (exc. L^crec.) Bk.

⁴ A^arec. β γ Ald. Dt.: βρύας C^a A^apr. F^a X^c Bk.: μβρύας G^a
 Q Ott.

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years.

River fishes too get their nourishment by eating each other and by eating plants and roots and anything they may find in the mud. They forage more during the night, and for the day they retreat into the deep water.

This then is how matters stand regarding the nutrition of the fishes.

Among the birds,^a all the crook-taloned are III
flesh-eating and cannot swallow grain even if fed by hand, for example all the kinds of eagle, and the kites, and both^b hawks — both the pigeon-hawk and the sparrow-hawk (these differ greatly in size from each other) — and the buzzard; the buzzard is the size of a kite and is seen throughout the year. Also phene and vulture; the phene's size is greater than an eagle's,^c its colour ashen; of the vultures there are two forms, one small and more whitish, the other larger and more ash-coloured. Also among the night-birds some are crook-taloned, for example

^a English names of birds are given here only when certain; for possible identifications of the others see Th.'s *Glossary of Greek Birds* together with the latest edition of LSJ and the notes to the translations by Louis and Vegetti. The MSS often vary in spelling the names.

^b At VIII(IX) 620a17 Arist. gives eleven names of hawks, including the buzzard as one, and reports that there were said to be at least ten different kinds.

^c But at VIII(IX) 619a12 he reports a "pure-bred" eagle larger than the phene.

- 10 ἔστι δ' ὁ βύας τὴν μὲν ἰδέαν ὅμοιος γλαυκί, τὸ
 δὲ μέγεθος αἰετοῦ οὐδὲν ἐλάττων. ἔτι δ' ἐλεὸς
 καὶ αἰγώλιος καὶ σκῶψ. τούτων δ' ὁ μὲν ἐλεὸς
 μείζων ἀλεκτρυόνος, ὁ δ' αἰγώλιος παραπλήσιος,
 ἀμφότεροι δὲ θηρεύουσι τὰς κίττας· ὁ δὲ σκῶψ
 ἐλάττων γλαυκός· πάντα δὲ ταῦτα τρία ὄντα
 15 ὅμοια τὰς ὄψεις καὶ σαρκοφάγα πάντα εἰσίν.¹
 εἰσὶ δὲ καὶ τῶν μὴ γαμφωνύχων ἔνιοι σαρκοφά-
 γοι, οἷον ἡ χελιδών.

τὰ δὲ σκωληκοφάγα, οἷον σπίζα, στρουθός,
 βατίς, χλωρίς, αἰγιθαλός. ἔστι δὲ τῶν αἰγιθαλῶν
 εἶδη τρία, ὁ μὲν σπιζίτης μέγιστος (ἔστι γὰρ
 ὅσον σπίζα), ἕτερος ὀρεινός² διὰ τὸ διατρίβειν ἐν
 20 τοῖς ὄρεσιν, οὐραῖον μακρὸν ἔχων· ὁ δὲ τρίτος
 ὅμοιος μὲν τούτοις, διαφέρει δὲ κατὰ τὸ μέγεθος·
 ἔστι γὰρ ἐλάχιστος. ἔτι δὲ συκαλὶς, μελαγκόρυ-
 φος, πυρρούλας, ἐρίθακος, ἐπιλαῖς, οἷστρος, τύ-
 ραννος· οὗτος τὸ μέγεθος μικρῶ μείζων ἀκρίδος,
 ἔστι δὲ φοινικοῦν λόφον ἔχων καὶ ἄλλως εὐχαρι
 25 τὸ ὄρνεον καὶ εὐρυθμον. ὁ δὲ λεγόμενος³ ἄνθος·
 οὗτος τὸ μέγεθος ὅσον σπίζα. ὀρόσπιζος· οὗτος
 σπίζῃ ὅμοιος καὶ τὸ μέγεθος παραπλήσιος, πλὴν
 ἔχει τὸν αὐχένα κυανοῦν, καὶ διατρίβει ἐν τοῖς

¹ εἰσίν om. a Bk.: ἐστίν L^c Ald.

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night-raven,^a little owl, eagle owl. The eagle owl in appearance is like the little owl, but in size is no smaller than an eagle. Also eleos, aigolios, scops. Of these the eleos is larger than a domestic cock, the aigolios about the same size, and both hunt the jays. The scops is smaller than the little owl. All three of these are alike in appearance and all are carnivorous. Some also that are not crook-taloned are carnivorous, for example the swallow.

Others are grub-eaters, for example chaffinch, sparrow, batis, greenfinch, titmouse. There are three forms of the titmice: the finch-tit is the largest (it is the size of a chaffinch); second is the mountain-tit (because it spends its time in the mountains), which has a long tail; and the third resembles them but differs in size, for it is the smallest. Also beccafico, black-cap, pyrroulas, erithacus, epilais, gadfly, tyrannus: the last is in size a little bigger than a locust and has a reddish^b crest and is in general a pretty and well-proportioned little bird. The bird called anthos: this is the size of a chaffinch. Mountain-finch: this is like a chaffinch and is comparable in size but has blue on the neck; it spends

^a The horned or long-eared owl, *Strix otus* L.

^b *φοινικοῦς*: the word used at *Sens.* 440a12 to describe the sun shining through mist; this suggests the goldcrest.

² *ἔτ. δ' ὀρ. C^a Bk.: ὀρ. δ' ἔτ. α*

³ *ὁ δὲ λεγόμενος β L^crec. Guil. Ald.: om. α γ Bk.*

ARISTOTLE

ὄρεσιν. ἔτι βασιλεύς, σπερμολόγος. ταῦτα μὲν οὖν καὶ τὰ τοιαῦτα τὰ μὲν ὅλως τὰ δ' ὥς ἐπὶ τὸ πολὺ σκωληκοφάγα.

30 τὰ δὲ τοιάδε ἀκανθοφάγα, ἀκανθίς, θραυπίς,
593a ἔτι ἡ καλουμένη χρυσομήτρις. ταῦτα γὰρ πάντα ἐπὶ τῶν ἀκανθῶν νέμεται, σκώληκα δ' οὐδὲν οὐδ' ἔμψυχον οὐδέν· ἐν ταύτῳ δὲ καθεύδει καὶ νέμεται ταῦτα.

ἄλλα δ' ἐστὶ σκνιποφάγα, ἃ τοὺς σκνίπας θηρεύοντα ζῇ μάλιστα, οἶον πιπῶ ἢ τε μείζων
5 καὶ ἐλάττων· καλοῦσι δέ τινες ἀμφοτέρα ταῦτα δρυοκολάπτας· ὅμοια δ' ἀλλήλοις καὶ φωνὴν ἔχουσιν ὁμοίαν πλὴν μείζω τὸ μείζον· νέμεται δ' ἀμφοτέρα ταῦτα πρὸς τὰ ξύλα προσπετόμενα. ἔτι κελεός· ἔστι δ' ὁ κελεὺς τὸ μέγεθος ὅσον τρυγῶν, τὸ δὲ χρῶμα χλωρὸς ὅλος· ἔστι δὲ ξυλο-
10 κόπος σφόδρα καὶ νέμεται ἐπὶ τῶν ξύλων τὰ πολλά, φωνὴν τε μεγάλην ἔχει· γίνεται δὲ μάλιστα τὸ ὄρνεον τοῦτο περὶ Πελοπόννησον. ἄλλος ὃς καλεῖται κνιπολόγος, τὸ μέγεθος μικρὸς ὅσον ἀκανθυλλίς, τὴν δὲ χροάν σποδοειδῆς καὶ κατα-
στικτός· φωνεῖ δὲ μικρόν· ἔστι δὲ καὶ τοῦτο ξυλοκόπον.

15 ἄλλα δ' ἔστιν ἃ ζῇ καρποφαγοῦντα καὶ ποιο-

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its time in the mountains. Also king-bird,^a rook.^b These then and birds of this kind feed either wholly or mostly on grubs.

The following are thorn-eaters: *akanthis*, *thraupis*, also the one called goldfinch. All these feed on the thorn-bushes and take no grubs nor anything living. They sleep and feed in the same place.

Others are sknipe-eaters and live mostly by hunting sknipes,^c for example the greater and lesser pie. Some call both these woodpeckers; they are like each other and their voice is alike except that the greater pie's is greater; they both feed by flying on to the tree trunks. Also green woodpecker: in size the green woodpecker is the same as a turtle-dove, in colour it is green all over; it is a vigorous pecker of wood and forages mostly on the trunks; its voice is loud; and the occurrence of this bird is chiefly in the Peloponnese. Another that is called sknipe-picker, in size as small as an *acanthyllis*, in colour ashen and speckled; its voice is small; it too is a pecker of wood.

There are others that live by eating grain and

^a One of several names for the wren, *Troglodytes*.

^b *σπερμόλογος* if taken as an adjective would mean seed-picking which would be inappropriate in this list of grub-eaters. Dt. considers it a gloss. But it is well attested as a name for the rook, *Corvus frugilegus*, which does also take grubs.

^c Insects living under tree bark, cf. VIII(IX) 614b1.

φαγοῦντα, οἷον φάψ¹ περιστερὰ οἰνὰς τρυγῶν.
 φάψ μὲν οὔν² καὶ περιστερὰ ἀεὶ φαίνονται, τρυ-
 γῶν δὲ τοῦ θέρους· τοῦ γὰρ χειμῶνος ἀφανίζε-
 ται· φωλεύει³ γάρ. οἰνὰς δὲ τοῦ φθινοπώρου καὶ
 φαίνεται μάλιστα καὶ ἀλίσκεται. ἔστι δὲ τὸ
 20 μέγεθος ἢ οἰνὰς μείζων μὲν περιστερᾶς, ἐλάττων
 δὲ φαβός· ἢ δ' ἄλωσις αὐτῆς γίνεται μάλιστα
 καπτούσης τὸ ὕδωρ. ἀφικνοῦνται δ' εἰς τοὺς
 τόπους τούτους ἔχουσαι νεοττούς· τὰ δ' ἄλλα
 πάντα τοῦ θέρους ἀφικνούμενα νεοττεύει ἐνταῦθα
 καὶ ἐκτρέφει τὰ πλείστα ζώοις, πλὴν τῶν περι-
 στεροειδῶν.

25 πάντων δ' ὥς εἰπεῖν τῶν ὀρνίθων οἱ μὲν
 πεζεύουσι περὶ τὴν τροφήν, οἱ δὲ περὶ ποταμοὺς
 καὶ λίμνας βιοτεύουσιν, οἱ δὲ περὶ τὴν θάλατταν,
 ὅσοι μὲν στεγανόποδες ἐν αὐτῷ τῷ ὕδατι
 ποιούμενοι τὴν πλείστην διατριβήν, ὅσοι δὲ

¹ β M^crec.: φάττα α K^c M^cpr. mcorr.: φάψ φάττα E^a P L^c
 mpr. n Ald. Bk.: *palumbi et turtures et fehita* Scot. Alb.:
fassa columba imas turtur Guil.: *palumbes columbus*
vinago turtur Gaza

² β L^crec. M^crec.: φάττα μὲν οὔν α K^c M^cpr. L^cpr. mrec.
 Guil. Ald. Bk.: φάψ μὲν οὔν φάττα E^a P: φάψ φάττα μὲν οὔν
 mpr. n: *fassa quidem igitur (et columba)* Guil.: *columbi*
atque palumbes Gaza: *palumbi autem et fehyta* Scot. Alb.

³ φωλεῖ α γ (exc. L^crec.) Ald. Bk.

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herbage, for example wood pigeon,^a common pigeon, oinas, turtle-dove. Now the wood pigeon and the common pigeon appear at all times, the turtle-dove in the summer: in winter it vanishes, for it goes into hiding. But the oinas is both seen and caught chiefly in the autumn. In size the oinas is bigger than the common pigeon but smaller than the wood pigeon; the catching of it is done mostly when it is gulping down water. They arrive at these regions bringing their young; but all the others birds, arriving in the summer, make their nests here; and most rear their young on animal food, except the pigeon sort.

Among practically all the birds,^b while some look for their food on land, the rest live either by rivers and lakes or by the sea, the web-footed spending most of their time on the water itself, those with

^a On "wood pigeon" see Additional Note on 593a15.

^b The birds reported so far in ch. 3 have been land birds, though Arist. has not divided them off as such. Now he divides off the water birds and applies two pairs of differentiae: web-footed/separate-toed and river/sea. 593b1 the separate-toed by rivers; b12 separate-toed by sea; b15 web-footed on rivers; (web-footed on sea: none); b23 water birds on both river and sea. This is necessarily a cross-division, but causes no confusion provided that the division is not made by progressive dichotomy but by simultaneous application of differentiae (cf. *PA* I 3). The whole discussion now enables us to apply three differentiae to each bird, namely food, locality and type of feet.

- σχιζόποδες περὶ αὐτὸ τὸ ὕδωρ, καὶ τούτων ἔνιοι
 διὰ τῶν δυομένων τρεφόμενοι ὅσοι μὴ σαρκοφάγοι.
 593b οἶον περὶ τε¹ τὰς λίμνας καὶ τοὺς ποταμοὺς ἔρω-
 διὸς καὶ ὁ λευκερωδιός· ἔστι δ' οὗτος τὸ μέγεθος
 ἐκείνου ἐλάττων καὶ ἔχει τὸ ῥύγχος πλατὺ καὶ
 μακρόν. ἔτι δέ² πελαργὸς καὶ λάρος· ὁ δὲ
 λάρος τὸ χρώμα σποδοειδής. καὶ σχοινίκλος³ καὶ
 5 κίγκλος καὶ ὁ τρύγγας·⁴ οὗτος δέ² μέγιστος τῶν
 ἐλαττόνων τούτων· ἔστι γὰρ οἶον⁵ κίχλη. πάντες
 δ' οὗτοι τὸ οὐραῖον κινουῦσιν. ἔτι σκαλίδρις· ἔστι
 δὲ τοῦτο τὸ ὄρνεον ποικιλίαν ἔχον, τὸ δ' ὅλον
 σποδοειδές. καὶ τὸ τῶν ἀλκυόνων⁶ δὲ γένος
 πάρυδρόν ἐστιν. τυγχάνει δ' αὐτῶν ὄντα δύο εἶδη,
 10 καὶ ἡ μὲν φθέγγεται καθιζάνουσα ἐπὶ τῶν
 δονάκων, ἡ δ' ἄφωνος· ἔστι δ' αὕτη μείζων·
 τὸν δὲ νῶτον ἀμφότεραι κυανοῦν ἔχουσιν. καὶ
 τροχίλος. περὶ δὲ τὴν θάλατταν καὶ ἀλκυὼν καὶ
 κήρυλος. καὶ αἱ κορῶναι δὲ νέμονται ἀπτό-
 μεναι τῶν ἐκπιπτόντων ζώων· παμφάγον γάρ
 15 ἐστιν. ἔτι δὲ λάρος ὁ λευκὸς καὶ κέπφος αἶθνα⁷
 χαραδριός.

τῶν δὲ στεγανοπόδων τὰ μὲν βαρύτερα περὶ

¹ μὲν α Bk.

² om. α γ (exc. L^{rec.}) Bk.

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separate toes beside the actual water—some of them feeding on submerged growths (those that are not carnivorous): for example, by lakes and rivers the heron and the white heron; the latter is smaller sized than the former, and its beak is flat and long. Also stork and gull; the gull is ashen-coloured. And schoiniklos and kinklos and trungas; these are smaller birds, of which the last-named is the biggest, having the size of a thrush; these all move their tails. Also skalidris; this bird is variegated but on the whole ash-coloured. Also the halcyon kind frequents water; there are in fact two forms of them, and one sings sitting on the reeds whereas the other is voiceless; the latter is bigger; both have blue on the back. And trochilos.^a By the sea there are both halcyon and kerylos. Also the crows feed by taking animals that are washed up on shore; for it is an omnivorous bird. Also the white gull and kepphos, aithya, charadrios.

Among the web-footed birds the heavier ones are

^a Here not the wren (as at VIII(IX) 615a17) but the crocodile bird (as at VIII(IX) 612a21), the Egyptian plover; cf. Herod. II 68.

³ *σχουνίλος* α (*σχουνιλος* C^a): *σχουνίλος* edd.

⁴ δ *τρύγγας* β γ Ald. Gaza Cs.: *πύγαργος* α Guil. Sn. Bk. Dt.: om. Scot.

⁵ δ σον α Guil. Sn. Bk.

⁶ codd.: *ἀηδόνων* L^c corr. Ald.: *ἀλκυόνων* Bk. (ut semper)

⁷ *αἰθυια* L^c Ald. Bk.: *αἰθεια* F^a X^c

τοὺς¹ ποταμοὺς καὶ λίμνας ἐστίν, οἷον κύκνος
 νήττα φαλαρίς κολυμβίς· ἔτι βόσκας ὅμοιος μὲν
 νήττη τὸ δὲ μέγεθος ἐλάττων, καὶ ὁ καλούμενος
 κόραξ· οὗτος δ' ἐστὶ τὸ μὲν μέγεθος οἷον πελαρ-
 20 γὸς πλὴν τὰ σκέλη ἔχει ἐλάττω, στεγανόπους δὲ
 καὶ νευστικός, τὸ δὲ χρῶμα μέλας· καθίζει δὲ
 οὗτος ἐπὶ τῶν δένδρων καὶ νεοττεύει ἐνταῦθα
 μόνος τῶν τοιούτων. ἔτι χῆν καὶ ὁ μικρὸς χῆν ὁ
 ἀγελαῖος καὶ χηναλώπηξ καὶ αἶξ καὶ πηνέλοψ.

ὁ δ' ἁλιαιετὸς καὶ περὶ τὴν θάλατταν διατρίβει
 καὶ τὰ λιμναῖα κόπτει.

25 πολλοὶ δὲ καὶ παμφάγοι τῶν ὀρνίθων εἰσίν. οἱ
 δὲ γαμφώνυχοι καὶ τῶν ἄλλων ἄπτονται ζώων
 ὅσων ἂν κρατῶσι καὶ τῶν ὀρνέων, πλὴν οὐκ
 ἀλληλοφάγοι τοῦ γένους τοῦ οἰκείου εἰσίν ὥσπερ
 οἱ ἰχθύες ἄπτονται πολλάκις καὶ ἑαυτῶν.

ἔστι δὲ τὸ τῶν ὀρνέων γένος πᾶν μὲν ὀλιγό-
 594a ποτον, οἱ δὲ γαμφώνυχες καὶ ἄποτοι πάμπαν, εἰ
 μὴ τι ὀλίγον γένος καὶ ὀλιγάκις. μάλιστα δὲ
 τοιοῦτον ἢ κεγχρίς. καὶ ἰκτῖνος ὀλιγάκις μὲν,
 ὥπται δὲ πίνον.²

IV τὰ δὲ φολιδωτὰ τῶν ζώων, οἷον σαῦρός τε καὶ
 5 τὰ τετράποδα τᾶλλα καὶ οἱ ὄφεις, παμφάγα

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by the rivers and lakes, for example swan, duck, phalaris, grebe^a; also teal, which is like a duck but smaller-sized, and the so-called raven^b; the latter is in size like a stork except that its legs are shorter; it is web-footed and good at swimming, and black in colour; it sits in the trees and nests there, the only such bird to do so. Also goose and the small gregarious goose and vulpanser^c and goat and penelops.

The sea-eagle both frequents the sea and takes prey from lakes.

Many birds too are omnivorous. The crook-taloned birds take any other animal that they can overcome, including birds, except that they do not eat each other within their own kind in the way that fishes often take their own.

All of the bird kind are sparing drinkers, while the crook-taloned do not drink at all except possibly a small group and these only rarely: such in particular is the kestrel, and the kite drinks rarely but has been seen drinking.

The horny-scaled animals, such as the lizard IV and the other quadrupeds and the snakes, are

^a The grebe has lobed toes which Arist. considers a form of webbed feet, PA IV 693a7, 694b2.

^b Cormorant.

^c Egyptian goose, cf. Rawlinson ad Herod. II 72.

¹ om. a Bk.

² *πίνων* A *mrec.* edd.

- ἐστίν· καὶ γὰρ σαρκοφάγα καὶ πόαν ἐσθίουσιν.
οἱ δ' ὄφεις καὶ λιχνότατοι τῶν ζώων εἰσίν. ἔστι
μὲν οὖν ὀλιγόποτα καὶ ταῦτα καὶ τᾶλλα ὅσα ἔχει
τὸν πλεύμονα σομφόν· ἔχουσι δὲ σομφὸν τὰ ὀλι-
γόαιμα¹ πάντα καὶ τὰ ὠτοκά. οἱ δ' ὄφεις καὶ
10 πρὸς τὸν οἶνόν εἰσιν ἀκρατεῖς, διὸ θηρεύουσί τινες
καὶ τοὺς ἔχεις εἰς ὀστράκια διατιθέντες οἶνον εἰς
τὰς αἱμασίας· λαμβάνονται γὰρ μεθύοντες. σαρ-
κοφάγοι δ' ὄντες οἱ ὄφεις ὃ τι ἂν λαμβάνωσι²
ζῶον ἐξικμάζοντες ὅλα κατὰ τὴν ὑποχώρησιν
προίενται. σχεδὸν δὲ καὶ τᾶλλα τὰ τοιαῦτα, οἷον
15 οἱ ἀράχνη· ἀλλ' ἔξω οἱ ἀράχνη ἐκχυμίζουσιν, οἱ
δ' ὄφεις ἐν τῇ κοιλίᾳ. λαμβάνει μὲν οὖν ὁ ὄφις
ὅθεν ἂν τύχῃ τὸ διδόμενον (ἐσθίει γὰρ καὶ ὀρνίθια
καὶ θηρία, καὶ ὧὰ καταπίνει), λαβὼν δ' ἐπανάγει
ἕως ἂν ἐπὶ τὸ ἄκρον ἐλθὼν εἰς εὐθὺ καταστήσῃ,
κᾶπειθ' οὕτως συνάγει ἑαυτὸν καὶ συστέλλει
20 εἰς μικρὸν ὥστ' ἐκταθέντος κάτω γίνεσθαι τὸ
καταποθέν. ταῦτα δὲ ποιεῖ διὰ τὸ τὸν στόμαχον

¹ ὀλίγαίμα P Bk.: om. C^a in lac.: ὀλιγόαιμον A^apr. G^a Q Sn.
A.-W. Dt. Peck L.-V.

² λάβωσι a Bk.: λαμβάνουσι P

^a Not necessarily the hungriest (cf. 594a22), but grab-
bing and swallowing whole whatever presents itself
(594a16); for the word, cf. Plato *Rep.* 354B.

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omnivorous; for they are both carnivorous and eat herbage. The snakes are also the most gluttonous^a of the animals. Now these animals too are sparing drinkers, together with all others whose lung is spongy^b; and it is spongy in all those with little blood and in the ovipara. But the snakes are also immoderate in regard to wine, and so people hunt even vipers by setting out wine in pieces of pottery in the dry-stone walls: they are caught while drunk. As carnivores, the snakes suck dry whatever animal they take and eject them whole with their excrement. It is much the same with the other animals of similar behaviour, for example the spiders; but the spiders suck out the juices outside, while the snakes do it within their stomach. Now the snake takes what is offered from whatever source (for it eats both small birds and animals, and swallows eggs whole); it grabs it and drags it forward until it has set it in a straight line all the way to the tail, and then draws itself in and contracts into a small space in such a way that when it has stretched out again the food it has swallowed has gone down.^c It does

^b Cf. PA III 669a25ff.

^c To force the prey down its gullet, the snake alternately stretches itself and contracts. The expression is concise and has been variously interpreted, but it is simplest to take ἐπανάγει as transitive with τὸ διδόμενον as its object understood, and to supply the same object for καταστήση.

εἶναι λεπτόν καὶ μακρόν. δύναται δ' ἄσιτα καὶ τὰ φαλάγγια καὶ οἱ ὄφεις πολὺν χρόνον ζῆν· ἔστι δὲ τοῦτο θεωρῆσαι ἐκ τῶν παρὰ τοῖς φαρμακοπώλοις¹ τρεφομένων.

- V τῶν δὲ τετραπόδων καὶ ζωοτοκούντων² τὰ
 26 μὲν ἄγρια καὶ καρχαρόδοντα πάντα σαρκοφάγα· πλὴν τοὺς λύκους φασὶν ὅταν πεινώσιν ἐσθίειν τινὰ γῆν, μόνον δὴ τοῦτο τῶν ζώων· πόας δ' ἄλλοτε μὲν οὐχ ἅπτονται, ὅταν δὲ κάμνωσι, καθάπερ καὶ αἱ κύνες ὅταν κάμνωσι³ ἐσθίουσαι
 30 ἀνεμοῦσι καὶ καθαίρονται. ἀνθρωποφαγοῦσι δ' οἱ μονοπεῖραι τῶν λύκων μᾶλλον αὐτῶν⁴ ἢ τὰ κυνηγέσια. ὃν δὲ καλοῦσιν οἱ μὲν γλάνον οἱ δ' ὕαιναν, ἔστι⁵ τὸ μέγεθος οὐκ ἔλαττον⁶ λύκου,
 594b χαίτην δ' ἔχει ὥσπερ ἵππος, καὶ ἔτι σκληροτέρας καὶ βαθυτέρας τὰς τρίχας, καὶ δι'⁷ ὅλης τῆς ῥάχεως. ἐπιβουλεύει δὲ καὶ θηρεύει τοὺς ἀνθρώπους, τοὺς δὲ κύνας καὶ ἐμοῦσα θηρεύει ὥσπερ οἱ ἀνθρωποι· καὶ τυμβωρυχεῖ δὲ ἐφιεμένον τῆς σαρκοφαγίας τῶν ἀνθρώπων.⁸

¹ -πώλαις *Pres. Bk.*: -πωλείοις *L^{rec.} m^{rec.} n*

² ζωοτόκων *a Bk.*

³ ὅταν κάμνωσι *om. a Guil. Cs. Bk.*

⁴ αὐτῶν *del. n^{rec.} : om. Gaza: secl. Sylb. Sn. Bk.*

⁵ ἔστι μὲν *a Bk.*

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this because its gullet is narrow and long. Both venom-spiders and snakes can live a long time without food; this can be observed from the animals kept at the drug-sellers'.

Among animals that are quadruped and V
viviparous, those that are wild and saw-toothed^a are all flesh-eaters; except that wolves are said to eat a certain kind of earth when hungry, the only animal to do so; but they do not take herbage except that when they are ill, just as hounds do too when they are ill, they eat it and vomit and purge themselves.^b Man-eating is a tendency of wolves themselves^c hunting singly rather than of the packs. The one that some call glanos and some hyena is of a size no smaller than a wolf's, but has a mane like a horse, though with even stiffer and denser hair, all along the spine. It plots against humans and hunts them, and it hunts dogs by vomiting^d like men; also it digs up graves in order to eat human flesh.

^a Explained at II 501a18.

^b Cf. VIII(IX) 612a6.

^c That is, in the nature of the wolf.

^d That is, by making a retching noise; Pliny VIII 44. 106: "it imitates a man's vomiting so as to attract the shepherds' dogs in order to attack them"; similarly Aelian VII 22.

⁶ ἐλάττων *Prec. Guil. Sn. Bk.*

⁷ καθ' α Bk.

⁸ τῶν ἀνθρώπων] τῆς τοιαύτης C^a A^apr. G^a Q *Guil. Sn. Bk.*

- ἡ δ' ἄρκτος παμφάγον ἐστί. καὶ γὰρ καρπὸν
 ἐσθίει, καὶ ἀναβαίνει ἐπὶ τὰ δένδρα διὰ τὴν ὑγρό-
 τητα τοῦ σώματος, καὶ τοὺς καρποὺς τοὺς χέδρο-
 πας· ἐσθίει δὲ καὶ μέλι τὰ σμήνη καταγνύουσα,
 καὶ καρκίνους καὶ μύρμηκας, καὶ σαρκοφαγεῖ.
 10 διὰ γὰρ τὴν ἰσχὺν ἐπιτίθεται οὐ μόνον τοῖς ἐλά-
 φοις ἀλλὰ καὶ τοῖς ἀγρίοις ὑσίν, ἐὰν δύνηται λα-
 θεῖν ἐπιπεσοῦσα, καὶ τοῖς ταύροις· ὁμόσε γὰρ
 χωρήσασα τῷ ταύρῳ κατὰ πρόσωπον ὑπτία
 καταπίπτει, καὶ τοῦ ταύρου τύπτειν ἐπιχειροῦν-
 15 τος τοῖς μὲν βραχίوشي τοῦ ταύρου¹ τὰ κέρατα
 περιλαμβάνει, τῷ δὲ στόματι τὴν ἀκρωμίαν
 δάκνουσα² καταβάλλει τὸν ταῦρον. βαδίζει δ'
 ἐπὶ τινα χρόνον ὀλίγον καὶ τοῖν δυοῖν ποδοῖν ὀρθή.
 τὰ δὲ κρέα πάντα κατεσθίει προσήπουσα πρῶτον.

- ὁ δὲ λέων σαρκοφάγον μὲν ἐστὶν ὥσπερ καὶ
 τᾶλλα ὅσα ἄγρια καὶ καρχαρόδοντα, τῇ δὲ βρώ-
 σει χρῆται λάβρως, καὶ καταπίνει πολλὰ³ οὐ
 20 διαιρῶν, εἴθ' ἡμέρας δύο ἢ τρεῖς ἀσιτεῖ· δύναται
 γὰρ διὰ τὸ ὑπερπληροῦσθαι. ὀλιγόποτον δ'
 ἐστίν. τὸ δὲ περίττωμα προέται σπανίως· διὰ
 τρίτης γὰρ ἢ ὅπως ἂν τύχη προχωρεῖ, καὶ τοῦτο
 ξηρὸν καὶ ἐξικμασμένον, ὅμοιον κυνί. προέται δὲ
 καὶ τὴν φῦσαν σφόδρα δριμεῖαν καὶ τὸ οὖρον ἔχον

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The bear is an omnivore. For it eats both fruit (climbing up into the trees by the suppleness of its body) and leguminous crops; it also eats honey, breaking the beehives, and crabs and ants, and is carnivorous. Because of its strength it attacks not only deer but wild pigs, if it can fall on them unawares, and bulls too; for it goes up close to the bull face to face and then falls over onto its back, and when the bull tries to strike it catches it round its horns with its forelegs and then bites its shoulder and throws the bull down with its mouth. It walks upright on one pair of feet for a short space of time. All the flesh that it eats it first allows to putrefy.^a

The lion is a carnivore like all others that are wild and saw-toothed. Its manner of devouring is violent, and it swallows much of its food without dividing it up, and then goes without food for two or three days: it can do this because it is over-full. It does not drink much. It discharges excrement sparsely: it is voided every other day or at random intervals, and is dry and desiccated like a dog's. Also the wind that it discharges is very pungent and

^a This sentence may have been displaced from 594b5 on the hyena (A.-W.).

¹ τοῦ ταύρου om. a Cs. Bk.

² δακοῦσα a Bk.

³ πολλὰ ἔλα a Bk.

25 ὁσμήν, διόπερ οἱ κύνες ὁσφραίνονται τῶν δέν-
δρων· οὐρεῖ γὰρ αἶρων τὸ σκέλος ὥσπερ οἱ κύνες.
ἐμποιεῖ δὲ καὶ ὁσμήν βαρεῖαν ἐν τοῖς ἐσθιομένοις
καταπνέων· καὶ γὰρ ἀνοιχθέντος αὐτοῦ τὰ ἔσω
ἀτμίδα ἀφίησι βαρεῖαν.

ἐνια δὲ τῶν τετραπόδων καὶ ἀγρίων ζώων
ποιεῖται τὴν τροφήν περὶ λίμνας καὶ ποταμούς·
30 περὶ δὲ τὴν θάλατταν οὐδὲν ἔξω φώκης. τοι-
αῦτα δ' ἐστὶν ὃ τε καλούμενος κάστωρ καὶ τὸ
σαθέριον καὶ τὸ σατύριον καὶ ἐνυδρὶς καὶ ἡ κα-
λουμένη λάταξ· ἔστι δὲ τοῦτο πλατύτερον τῆς
595a ἐνυδρίδος, καὶ ὀδόντας ἔχει ἰσχυρούς· ἐξιούσα γὰρ
νύκτωρ πολλάκις τὰς περὶ τὸν ποταμὸν κερκίδας
ἐκτέμνει τοῖς ὁδοῦσιν. δάκνει δὲ τοὺς ἀνθρώ-
πους καὶ ἡ ἐνυδρὶς καὶ οὐκ ἀφίησιν, ὥς λέγουσι,
μέχρι ἂν ὁστοῦ ψόφον ἀκούσῃ. τὸ δὲ τρίχωμα
5 ἔχει ἡ λάταξ σκληρὸν καὶ τὸ εἶδος μεταξὺ τοῦ τῆς
φώκης τριχώματος καὶ τοῦ τῆς ἐλάφου.

VI πίνει δὲ τῶν ζώων τὰ μὲν καρχαρόδοντα λάπ-
τοντα, ἐνια δὲ καὶ τῶν μὴ καρχαροδόκτων οἶον
οἱ μῦες. τὰ δὲ συνόδοντα σπάσει, οἶον ἵπποι καὶ
10 βόες. ἡ δ' ἄρκτος οὔτε σπάσει οὔτε λάψει, ἀλλὰ
κάψει. καὶ τῶν ὀρνέων δὲ τὰ μὲν ἄλλα σπάσει,

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its urine has a smell; hence the dogs sniff at the trees, for it urinates lifting its leg like dogs. It also imparts a heavy smell to what it is eating, by breathing on it; in fact when it is opened up its inside emits a heavy vapour.

Certain of the animals that are quadruped and wild get their food at lakes and rivers, but none at the sea except the seal. The former sort include the so-called castor,^a the satherion, the saturion, otter and the so-called latax: the latter is a broader animal than the otter, and its teeth are strong; for on emerging at night it often cuts down the riverside aspens with its teeth. The otter too bites humans and does not let go, so they say, until it has heard the sound of bone. The coat of the latax is stiff, in appearance midway between the seal's coat and the deer's.

The saw-toothed animals drink by lapping, and so do some that are not saw-toothed, for example the mice. But those with teeth that meet drink by sucking, for example horses and cattle. But the bear drinks neither by sucking nor by lapping but by gulping. And among the birds most drink by suck-

VI

^a Dt. secludes "castor" and "saturion" on the grounds that only three different animals are available for the five names given here. But even if this is true, it may still be that the writer thought there were five. Castor and *ἐνυδρις* are generally accepted as beaver and otter; satherion (variously spelled) and saturion are unknown; latax looks like another beaver, though Louis suggests a large water rat (note at I 487a22).

πλὴν τὰ μὲν μακράυχена διαλείποντα καὶ αἶροντα
τὴν κεφαλὴν, ὃ δὲ πορφυρίων μόνος κάψει.

- τὰ δὲ κερατώδη τῶν ζώων καὶ ἡμερα καὶ
ἄγρια, καὶ ὅσα μὴ καρχαρόδοντα, πάντα καρπο-
15 φάγα καὶ ποηφάγα ἐστί, μὴ λαν κατεχόμενα τῷ
πεινῇν, ἔξω τῆς ὕος. αὕτη δ' ἡκιστα ποηφάγον
καὶ καρποφάγον ἐστίν· ριζοφάγον δὲ μάλιστα ἡ
ὑς ἐστὶ τῶν ζώων διὰ τὸ εὖ πεφυκέναι τὸ ῥύγχος
πρὸς τὴν ἐργασίαν ταύτην· καὶ εὐχερέστατον
πρὸς πᾶσαν τροφήν τῶν ζώων ἐστίν. τάχιστα δὲ
20 καὶ ἐπιδίδωσιν εἰς παχύτητα ὥς κατὰ μέγεθος·
πιαίνεται γὰρ ἐν ἑξήκοντα ἡμέραις· ὅσον δ' ἐπι-
δίδωσιν, ἐπιγινώσκουσιν¹ οἱ περὶ ταῦτα πραγμα-
τευόμενοι νῆστιν ἰστάντες. πιαίνεται δὲ προλι-
μοκτονηθεῖσα ἡμέρας τρεῖς· σχεδὸν δὲ καὶ τᾶλλα
πάντα προλιμοκτονούμενα πιαίνεται. μετὰ δὲ
25 τὰς τρεῖς ἡμέρας εὐωχοῦσιν ἤδη οἱ πιαίνοντες τὰς
ὑς. οἱ δὲ Θρᾶκες πιαίνουνσι τῇ μὲν πρώτῃ
πιεῖν διδόντες, εἶτα διαλείπουσιν ἡμέραν μίαν τὸ
πρῶτον, μετὰ δὲ ταῦτα δύο, εἶτα καὶ² τρεῖς καὶ

¹ γινώσκουσιν a Bk.

² om. a Bk.

^a Cf. II 509a11. It has been identified as purple coot, purple gallinule, and even flamingo; but the numerous

ing, except that the long-necked birds interrupt their drinking and lift their heads, while the porphurion^a is the only one that drinks by gulping.

The horned animals, both tame and wild, and all that are not saw-toothed, are all eaters of grain and herbage, unless overcome by hunger, apart from the pig. The latter is the least inclined to eat herbage and grain; but the pig is the animal most inclined to eat roots because of the fact that its snout is naturally well constituted for this activity^b; and it is the animal that takes most easily to every food. It is also the quickest to fatten in proportion to its size, for it fattens in sixty days. The amount of increase is ascertained by those engaged in this business by weighing the pig unfed. Before fattening it is first starved for three days; nearly all other animals too are starved before fattening. After the three days the people fattening the pigs start feeding them lavishly. When the Thracians fatten them they allow them to drink on the first day, then leave an interval of one day on the first occasion, after that they leave two days, then three, then four, up to

ancient descriptions do not fit any of these well (cf. Athen. IX 388C). Discussed by Camus II s.v. and Th. *GGB* s.v.

^b This statement has been thought to contradict Arist.'s principle that organs are determined by functions, not vice versa; but the sense is that the snout has naturally grown for its activity, and this is not opposed to the formulation at PA IV 694b14: "Nature makes organs to suit the work they have to do, not the work to suit the organs". Cf. also PA I 645b20. On teleology in *HA* see note at 591b27.

τέτταρας μέχρι τῶν ἑπτά. πιαίνεται δὲ τὸ ζῶον
 τοῦτο κριθαῖς κέγχροις σύκοις ἀκύλαις¹ ἀχράσι
 30 σικύοις. μάλιστα δὲ καὶ ταῦτα καὶ τᾶλλα τὰ
 ἔχοντα κοιλίαν ἀγαθὴν² ἢ ἀτρεμία πιαίνει· τὰς
 δ' ὕς καὶ τὸ λούεσθαι ἐν πηλῷ. νέμεσθαι δὲ βού-
 595b λονται κατὰ τὰς ἡλικίας. μάχεται δὲ ὕς καὶ
 λύκῳ. ἀπογίνεται δ' ἀπὸ τοῦ σταθμοῦ, ὅσον
 ἔλκει ζῶσα, τὸ ἕκτον μέρος εἰς τρίχας καὶ αἷμα
 καὶ τὰ τοιαῦτα. θηλαζόμεναι δὲ καὶ αἱ ὕες καὶ
 τᾶλλα πάντα λεπτότερα γίνεται. ταῦτα μὲν οὖν
 5 τοῦτον ἔχει τὸν τρόπον.

VII οἱ δὲ βόες εἰσὶ μὲν καὶ καρποφάγοι καὶ पोη-
 φάγοι, πιαίνονται δὲ τοῖς³ φυσητικοῖς, οἷον ὀρό-
 βοις καὶ κυάμοις ἐρηριγμένοις καὶ χλόῃ κυάμων,
 καὶ ἂν τις τὸ δέρμα ἐκτεμὼν φυσῇσιν καὶ μετὰ
 ταῦτα παράσχῃ τὴν τροφήν τοῖς πρεσβυτέροις,
 10 ἔτι δὲ κριθαῖς καὶ ἀπλαῖς⁴ καὶ ἐπιτισμέναις καὶ
 τοῖς γλυκέσιν οἷον σύκοις καὶ ἀσταφίσι καὶ οἶνω
 καὶ τοῖς φύλλοις τῆς πτελέας· μάλιστα δ' οἱ
 ἥλιοι καὶ τὰ λούτρα τὰ θερμά. τὰ δὲ κέρατα τῶν
 νέων χλιαινόμενα τῷ κηρῷ ἄγεται ῥαδίως ὅπου

¹ ἀκύλοις C^a Sylb. edd.: ἀκούλοις A^{ap}. G^a Q

² C^a β γ Guil.: θερμὴν ἀγαθὴν α: calidus Gaza: θερμὴν Sn.
 Bk. Dt.

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seven. This animal is fattened on barley, millet, figs, acorns, wild pears, cucumbers. The best way to fatten these and the other animals that have a good stomach is to avoid startling them^a; and pigs are helped to fatten by wallowing in mud. They like to forage by age groups. The pig fights even with the wolf. One sixth of its live weight goes into hair, blood, etc. While suckling young, sows and all other animals get thinner. This then is how these matters stand.

Cattle eat both grain and herbage, but are fat- VII
tened by the wind-vegetables,^b such as bitter vetches and bruised beans and bean stalks, and in the case of the older animals by cutting into the skin and inflating it before offering the food; they are also fattened on barley, both whole and winnowed, and on sweet foods like figs, raisins, wine,^c elm leaves; especially helpful are sunshine and warm baths. Young cattle's horns if warmed with wax can be bent easily in any direction one wishes; also they

^a Fear upsets the stomach, PA IV 679a26.

^b The leguminous plants (cf. III 522b32, IX(VII) 588a7). That wind assists nutrition is possibly the point in the next two lines, cf. 603b30.

^c Th. conjectures "raisins of wine" in the sense of *στέμφυλα*, the marc or crushed grapes from the wine-press.

³ τοῖς τε α Bk.

⁴ ἀπλῶς α γ (exc. L^c) Cs. Bk. Dt.

- 15 ἂν τις ἐθέλῃ· καὶ τοὺς πόδας δ' ἥττον ἀλγοῦσιν
 ἐάν τις τὰ κέρατα ἀλείφῃ κηρῷ ἢ πίστῃ ἢ
 ἐλαίῳ. πονοῦσι δ' αἱ ἀγέλαι¹ μᾶλλον ὑπὸ τῆς
 πάχνης μετανιστάμεναι ἢ ὑπὸ χιόνος. αὐξάνον-
 ται δὲ ὅταν πλείω ἔτη ἀνοχευτοὶ ᾧσιν· διὸ οἱ ἐν
 τῇ Ἡπείρῳ τὰς καλουμένας πυρρίχας βοῦς ἐννέα
 ἔτη διατηροῦσιν ἀνοχεύτους καὶ καλοῦσιν ἀπο-
 ταύρους, ὅταν² αὐξωνται.³ τούτων δὲ τὸ μὲν
 20 πλῆθος εἶναί φασι περὶ τετρακοσίους,⁴ ἰδίους τῶν
 βασιλέων, ἐν ἄλλῃ δὲ ζῆν χώρα οὐ δύνασθαι·
 καίτοι πεπειρᾶσθαι τινας.
 VIII ἵπποι δὲ καὶ ὀρεῖς καὶ ὄνοι καρποφάγα⁵ μὲν
 ἐστὶ⁶ καὶ ποηφάγα,⁷ μάλιστα δὲ πιαίνεται τῷ
 ποτῷ· ὥς γὰρ ἂν πίνῃ τὰ ὑποζύγια τὸ ὕδωρ,
 25 οὕτω καὶ πρὸς τὴν ἀπόλαυσιν ἔχει τῆς τροφῆς,
 καὶ ὅποιον⁸ ἂν ἥττον δυσχεραίνῃ τὸ ποτόν, τοῦτο
 μᾶλλον εὐχορτόν.⁹ ἡ δὲ κρᾶστις λειοτριχεῖν ποιεῖ
 ὅταν ἔγκυος ᾖ· ὅταν δ' ἀθέρᾳς ἔχῃ σκληροὺς οὐκ

¹ α β L^frec. Ald.: ἀγελαῖαι C^a Ppr. Bk.: ἀγέλαι αἱ γ: ἀγε-
λαῖαι αἱ Prec.: *gregales* Guil.

² C^a γ Ald.: ὅτε β: ὅπως α P Sn. Bk.: *ut* Scot. Guil. Gaza

³ αὐξάνωνται α Sn. Bk.

⁴ C^a γ Ald.: τετρακοσίας A^a G^a Q Bk.: τριακοσίας F^a X^c:
τριακοσίους β Canis.: *quadringsentas* Scot. Guil. Gaza

⁵ -φάγοι α Bk.

⁶ εἰσι α Bk.

suffer less in the feet if one smears the horns^a with wax or pitch or oil. When the herds are being moved they suffer more from frost than from snow. They grow bigger when they remain unmated for several years; hence the Epirotes keep the so-called ruddy^b cows unmated for nine^c years, calling them unbullied, when they are growing. These cattle are said to number about four hundred and to belong to the kings, and to be unable to live in any other region, although some have tried them.

Horses, mules and asses are grain and herbage eaters, but are chiefly fattened by their drink: for according to how the beasts of burden drink their water, so they vary in their enjoyment of their food, and whatever drinking water is less disagreeable to them provides more fattening pasture. Green pasture, when it is forming seed, gives them a smooth coat; but when it has stiff awns it is not good. The

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^a Cf. 604a16.

^b All MSS have *πυρρίχας* (*pirricas* Guil.), which is known only as a Doric form of *πυρρός* "red" (Theocr. 4. 20). Dt. conjectures *πυρρικὰς* ("Pyrrhic") from III 522b24, where see Peck's note. Pliny VIII 70. 176, apparently derived from that passage, associates these cattle with king Pyrrhus, and "Pyrrhic" might refer to the royal house of Epirus, who claimed descent from Neoptolemus Pyrrhus the son of Achilles; but it is hard to see why this should have been corrupted to the rarer word.

^c Pliny VIII 70. 176 says four years.

⁷ ποιοφάγοι α: ποηφάγοι Bk.

⁸ ὅπου δ' α Bk.

⁹ post εὐχ. add. ἐστιν α K^c M^c Bk.: ἔτι m

ἀγαθή. τῆς δὲ πόας τῆς Μηδικῆς ἢ τε πρωτό-
 κουρος φαύλη, καὶ ὅπου ἂν ὕδωρ δυσῶδες ἐπάγη-
 30 ται· ὅξει γὰρ τῆς πόας. πίνειν δ' οἱ μὲν βόες
 ζητοῦσι καθαρὸν, οἱ δ' ἵπποι ὥσπερ καὶ¹ αἱ
 κάμηλοι· ἡ δὲ κάμηλος πίνει ἡδιον θολερὸν καὶ
 596a παχύ, οὐδ' ἀπὸ τῶν ποταμῶν πρότερον πίνει ἢ
 συνταράξει. δύναται δ' ἄποτος ἀνέχεσθαι καὶ
 τέτταρας ἡμέρας· εἶτα μετὰ ταῦτα πίνει πολὺ
 πλήθος.

IX ὁ δ' ἐλέφας ἐσθίει πλεῖστον μὲν μεδίμνους
 Μακεδονικοὺς ἐννέα ἐπὶ μιᾷ ἐδωδῆς· ἐπικίνδυ-
 5 νον δὲ τὸ τοσοῦτον πλήθος· τὸ δ' ἐπίπαν ἕξ
 μεδίμνους ἢ ἐπτὰ, ἀλφίτων δὲ πέντε² καὶ οἴνου
 πέντε μάρεις (ἔστι δ' ὁ μᾶρις ἕξ κοτύλαι). ἤδη
 δέ τις ἔπιεν ἐλέφας μετρητὰς ὕδατος Μακεδони-
 κοὺς εἰσάπαξ δέκα καὶ τέτταρας, καὶ πάλιν τῆς
 δείλης ἄλλους ὀκτώ.

10 ζῶσι δ' αἱ μὲν πολλαὶ τῶν καμήλων περὶ ἔτη
 τριάκοντα, ἔνιαι δὲ πολλῶ πλείω· καὶ γὰρ εἰς
 ἔτη ἑκατὸν ζῶσιν. τὸν δ' ἐλέφαντα ζῆν φασιν³
 οἱ μὲν περὶ ἔτη τριακόσια οἱ δὲ διακόσια.⁴

X πρόβατα δὲ καὶ αἰγες εἰσὶ μὲν ποηφάγα, τὴν
 δὲ νομὴν ποιοῦνται τὰ μὲν πρόβατα προσεδρεύ-

¹ καὶ om. a Bk.

² πέντε μεδίμνους a Guil. edd.

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first cut of the Medic grass^a is poor, and so is any that has an ill-smelling water supply, for the smell comes off the grass. For drinking, the cattle look for clean water, but the horses do as camels also do: the camel prefers its drink muddy and thick, and does not drink river water before stirring it up. It can endure without drinking up to four days, then after that it drinks a large amount to fill itself.

The elephant eats at most nine Macedonian medimni^b in one feed, but to fill it up with so much is dangerous; normally it takes six or seven medimni, five of barley groats, and five mareis of wine (the maris is six kotulae). There was one elephant that drank fourteen Macedonian metretae of water at one time, and eight more again that afternoon. IX

Most camels live about thirty years, some much longer: for they even live to one hundred years. The elephant is said by some to live about three hundred years, by others two hundred.

Sheep and goats are herbage eaters but in foraging the sheep graze intensively and stay in one X

^a Alfalfa, lucerne.

^b It is not certain how much the Macedonian may have differed from the Attic medimnus, which at this time was about 52 litres (1½ bushels). For weights and measures see Appendix.

³ φασιν ante οί δὲ transp. α Guil. Bk.

⁴ διακόσια . . . τριακόσια transp. α Guil. Gaza Bk.

- 15 οντα καὶ μονίμως, αἱ δ' αἶγες ταχὺ μεταβάλλου-
σαι καὶ τῶν ἄκρων ἀπτόμεναι μόνον. πιαίνει δὲ
μάλιστα τὸ πρόβατον τὸ ποτόν, διὸ καὶ τοῦ θέ-
ρους διδόασιν ἄλας διὰ πέντε ἡμερῶν μέδιμνον
τοῖς ἑκατόν· γίνεται γὰρ οὕτως ὑγιεινότερον καὶ
20 πιότερον τὸ ποιμνίον. καὶ τὰ πολλὰ δὲ ἀλίζον-
τες διὰ τοῦτο προσφέρουσιν, οἶον ἔν τε τοῖς ἀχύ-
ροις ἄλας πολλούς (διψῶντα γὰρ πίνει μᾶλλον)
καὶ τοῦ μετοπώρου τὴν κολοκύντην¹ ἀλλὶ πᾶττον-
τες· τοῦτο γὰρ καὶ γάλα ποιεῖ πλείον. καὶ
κινούμεναι δὲ μεσημβρίας πίνουσι μᾶλλον πρὸς
τὴν δειλὴν. πρὸς τε τοὺς τόκους ἀλίζόμεναι
25 μείζω τὰ οὐθατα καθιᾶσιν. πιαίνει δὲ τὰ πρόβατα
θαλλός, κότινος, ἀφάκη, ἄχυρα ὅποια ἂν ᾖ·
πάντα² δὲ μᾶλλον πιαίνει ἄλμη προορανθέντα.³
παχύνεται δὲ καὶ ταῦτα μᾶλλον προλιμοκτονη-
θέντα τρεῖς ἡμέρας. ὕδωρ δὲ⁴ προβάτοις τοῦ
μετοπώρου τὸ βόρειον τοῦ νοτίου ἁμείνον, καὶ αἱ
νομαὶ αἱ πρὸς ἐσπέραν συμφέρουσιν, λεπτύνουσι
30 δ' αἱ ὁδοὶ καὶ αἱ ταλαιπωρίαι.
οἱ δὲ ποιμένες γινώσκουσι τὰς ἰσχυράς⁵ τῶν
596b ὁρίων⁶ ὅταν χειμῶν ᾖ τῷ πάχυνῃ ἔχειν,⁷ τὰς δὲ

¹ κολοκύντην α Bk.² ἅπαντα α Bk.: πάντων L^{pr}. n³ προορανθέντα C^a Bk.: προοραθέντα α⁴ δὲ τοῖς α Bk. ⁵ ἰσχυρούσας α Bk.

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place, while the goats quickly move on and only graze the tops. Flocks are fattened chiefly by their drink, hence in summer they give them salt every five days at the rate of a medimnus for one hundred animals; for this makes the flock healthier and fatter. And for this reason they give most of their feeds with salt, for instance putting a good deal of salt in the bran (for they become thirsty and more inclined to drink) and in the autumn they sprinkle gourd with salt; for this also increases their milk. Also, if they are kept moving at midday they tend more to drink towards late afternoon. And with respect to their young, through being given salt they develop their udders bigger. The flocks are also fattened by young olive shoots, wild olive, vetchling, bran of any kind; and all are more fattening if first sprinkled with salt water. These animals too^a put on more if they are first starved for three days. In autumn water that is northerly^b rather than southerly is better for flocks; pastures that face west are beneficial. But journeys and fatigue make them thin.

The shepherds recognise the strong ewes when it is winter, because they have frost on them, and the

^a Like pigs, 595a22.

^b Facing into the north wind. For the importance attached to aspect cf. Hippocr. *Airs Waters Places* 4-10 (II 14, 18, 22, 30, 38 L).

⁶ α β Ald.: οἰῶν L^c m Bk.: ὕδω E^a P K^c M^c: οἱ ὕδω n: ovium Guil. Gaza ⁷ ἐχ. παχ. transp. α Bk.

τῶ¹ μὴ ἔχειν· διὰ γὰρ τὴν ἀσθένειαν κινούμεναι
 ἀποβάλλουσιν αἱ μὴ ἰσχύουσαι. παντὸς δὲ
 τετράποδος τὰ κρέα χείρω² ὅπου εἰς³ ἐλώδη
 χωρία νέμονται ἢ ὅπου μετεωρότατα.⁴ εἰσὶ δ'
 5 εὐχειμερώτεροι αἱ πλατύκερκοι ὄϊες τῶν μακρο-
 κέρκων, καὶ αἱ κολέραι τῶν λασίων· δυσχείμεροι
 δὲ καὶ αἱ αἰγες.⁵ ὑγιεινότεραι μὲν οὖν αἱ ὄϊες
 τῶν αἰγῶν, ἰσχύουσι δὲ μᾶλλον αἱ αἰγες τῶν
 ὀρίων. τῶν δὲ λυκοβρώτων προβάτων τὰ κώδια
 καὶ τὰ ἔρια καὶ τὰ ἐξ αὐτῶν ἱμάτια φθειρωδέστερα
 γίνεται πολὺ μᾶλλον τῶν ἄλλων.

XI τῶν δ' ἐντόμων τὰ μὲν ἔχοντα ὀδόντας παμ-
 11 φάγα ἐστί, τὰ δὲ γλῶτταν μόνον τοῖς ὑγροῖς
 τρέφεται, πάντοθεν ἐκχυλίζοντα ταύτη. καὶ
 τούτων τὰ μὲν παμφάγα (πάντων γὰρ γεύεται⁶
 χυμῶν), οἷον αἱ μυῖαι, τὰ δ' αἰμοβόρα, καθάπερ
 15 μύωψ καὶ οἷστρος· τὰ δὲ φυτῶν καὶ καρπῶν ζῇ
 χυλοῖς. ἡ δὲ μέλιττα μόνον πρὸς οὐδὲν προσίζει
 σαπρόν, οὐδὲ χρῆται τροφῇ οὐδεμιᾷ ἀλλ' ἢ τῇ
 γλυκύν ἐχούσῃ χυμόν· καὶ ὕδωρ δ' ἡδιστον⁷ εἰς
 ἐαυτὰς λαμβάνουσιν ὅπου ἂν⁸ ἀναπηδᾷ.

¹ om. α (exc. A^arec.) Bk.

² χερῖω Bk. (typ. err.) Louis

³ om. α Guil. Sylb. Sn. Bk.

⁴ -τερα α γ Ald. Bk.

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others because they do not: for because of their weakness they move about and throw it off. Every quadruped's flesh is worse where their grazing leads into marshy ground than where it is on the heights. The broad-tailed sheep winter better than the shaggy; but goats actually winter badly. Now sheep are healthier than goats, although goats are more powerful than sheep. The fleeces and the wool of flocks that have been devoured by wolves, and the garments made from them, tend to become more infested with lice than the others.

Among the insects, those that have teeth are XI
omnivorous, while those with only a tongue feed on liquids, using the tongue to extract juices from every possible source. Some of these are omnivorous, having a taste for every juice, for example the flies, while others are bloodsuckers like horse fly and gadfly; others live on the juices of plants and fruits. The bee alone settles near nothing rotten, nor does it take any food except what tastes sweet. Bees also take the most pleasant water for themselves wherever it springs up.

⁵ β γ Ald.: οὐλαι α Scot. Guil. Gaza Cs. Bk.

⁶ γευ. τῶν α Bk.

⁷ ἥδιστα α Guil. Gaza Bk.

⁸ αὐ καθαρόν α Guil. Gaza Cs. edd.

τροφαῖς μὲν οὖν χρῶνται τὰ γένη τῶν ζώων
ταῖς εἰρημέναις.

- XII αἱ δὲ πράξεις αὐτῶν ἅπασαι περὶ τε τὰς
21 ὀχείας καὶ¹ τεκνώσεις εἰσὶ, καὶ περὶ τὰς εὐπορίας
τῆς τροφῆς, καὶ πρὸς τὰ ψύχη καὶ τὰς ἀλέας
πεπορισμέναι καὶ πρὸς τὰς μεταβολὰς² τῶν
ώρων. πάντα γὰρ τῆς κατὰ τὸ θερμὸν καὶ
25 ψυχρὸν μεταβολῆς αἰσθησιν ἔχει σύμφυτον, καὶ
καθάπερ τῶν ἀνθρώπων οἱ μὲν εἰς τὰς οἰκίας τοῦ
χειμῶνος μεταβάλλουσιν, οἱ δὲ πολλῆς χώρας
κρατοῦντες θερίζουσι μὲν ἐν τοῖς ψυχροῖς χειμά-
ζουσι δ' ἐν τοῖς ἀλεεινοῖς, οὕτω καὶ τῶν ζώων τὰ
δυνάμενα μεταβάλλειν τοὺς τόπους. καὶ τὰ μὲν
ἐν αὐτοῖς τοῖς συνήθεσι τόποις εὐρίσκεται τὰς
30 βοηθείας, τὰ δ' ἐκτοπίζει, μετὰ μὲν τὴν φθινο-
πωρινὴν ἰσημερίαν ἐκ τοῦ Πόντου καὶ τῶν
597a ψυχρῶν τόπων φεύγοντα τὸν ἐπιόντα χειμῶνα,
μετὰ δὲ τὴν ἔαρινην ἐκ τῶν θερμῶν εἰς τοὺς τό-
πους τοὺς ψυχροὺς φοβούμενα τὰ καύματα, τὰ μὲν
ἐκ τῶν ἐγγυὲς τόπων ποιούμενα τὰς μεταβολάς,
τὰ δὲ καὶ ἐκ τῶν ἐσχάτων ὥς εἰπεῖν, οἷον αἱ
5 γέρανοι ποιοῦσιν· μεταβάλλουσι γὰρ ἐκ τῶν
Σκυθικῶν πεδίων εἰς τὰ ἔλη τὰ ἄνω τῆς Αἰγύ-

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The foods taken by the animal kinds, then, are those stated above.

Their activities^a all have to do with mating or XII
production of young, or with their supply of food, or are contrived against periods of cold and heat or the changes of the seasons. For all animals have an innate perception of change in respect of hot and cold, and just as among humans some move indoors during the winter while others who command extensive territory spend the summer in the cold parts and the winter in the warm sunny parts, so it is with those animals that are able to change their locations. Some find protection for themselves actually in their habitual locations, while others migrate: after the autumnal equinox they leave the Pontus^b and the cold places to escape the oncoming winter, and after the vernal equinox they go from warm to cold places in fear of hot spells. Some make their moves from nearby places, but others from practically the farthest, as the cranes do: for they move from the Scythian plains to the marshes above

^a Cf. 589a3.

^b Lit. "the sea"; it commonly denotes the Euxine (Black Sea) and the whole region of its southern coast as here.

¹ καὶ τὰς α (exc. C^a) Bk.

² μετ. τὰς α Bk.

- πτου ὅθεν ὁ Νεῖλος ῥεῖ· ἔστι δὲ ὁ τόπος οὗτος
περὶ ὃν οἱ πυγμαῖοι κατοικοῦσιν.¹ οὐ γάρ ἐστι
τοῦτο μῦθος ἀλλ' ἔστι κατὰ τὴν ἀλήθειαν γένος
μικρὸν μὲν ὥσπερ λέγεται, καὶ αὐτοὶ καὶ οἱ
ἵπποι, τραγλοδύται δ' εἰσὶ τὸν βίον. καὶ οἱ πε-
10 λεκᾶνες δ' ἐκτοπίζουσι, καὶ πέτονται ἀπὸ τοῦ
Στρυμόνος ποταμοῦ ἐπὶ τὸν Ἰστρον καὶ κεῖ τεκνο-
ποιοῦνται· ἄθροοι δ' ἀπέρχονται, ἀναμένοντες οἱ
πρότεροι τοὺς ὕστερον διὰ τὸ ὅταν ὑπερπτῶνται
τὸ ὄρος ἀδήλους γίνεσθαι τοὺς ὑστέρους τοῖς προ-
τέροις.² καὶ οἱ ἰχθύες δὲ τὸν αὐτὸν τρόπον οἱ μὲν
15 ἐκ τοῦ Πόντου καὶ εἰς τὸν Πόντον μεταβάλλου-
σιν, οἱ δ' ἐν μὲν τῷ χειμῶνι ἐκ τοῦ πελάγους
πρὸς τὴν γῆν τὴν ἀλέαν διώκοντες, ἐν δὲ τῷ
θέρει ἐκ τῶν προσγείων εἰς τὸ πέλαγος φεύγον-
τες τὴν ἀλέαν. καὶ τὰ ἀσθενῆ δὲ τῶν ὀρνέων ἐν
μὲν τῷ χειμῶνι καὶ τοῖς πάγοις εἰς τὰ πεδία
20 καταβαίνουνσι διὰ τὴν ἀλέαν, ἐν δὲ τῷ θέρει ἀπο-
χωροῦσιν εἰς τὰ ὄρη ἄνω διὰ τὰ καύματα. ποιεῖ-
ται δ' αἰεὶ τὰ ἀσθενέστερα πρῶτα τὴν μετᾶστα-
σιν καθ' ἑκατέραν τὴν ὑπερβολήν, οἷον οἱ μὲν
σκόμβροι τῶν θύννων οἱ δ' ὀρτυγες τῶν γερά-

¹ ἔστι . . . κατοικοῦσιν] οὗ καὶ λέγονται τοῖς πυγμαίοις ἐπιχει-
ρεῖν g Scot. Gaza Bk.

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Egypt from where the Nile flows; this is the region whereabouts the pygmies live^a (for they are no myth, but there truly exists a kind that is small, as reported—both the people and their horses—and they spend their life in caves). Pelicans too migrate, and fly from the river Strymon to the Ister^b and there produce young. They depart in a flock, those in front waiting for those behind because after flying over the mountain those behind become invisible to those in front.^c The fishes too migrate in the same way, some moving out of the Pontus and into the Pontus while others move in winter from the deep sea towards the land in pursuit of the warmth and in summer from inshore to the deep sea escaping the warmth. Among the birds too the weak ones come down to the plains for warmth in winter and in frosts, and go back in summer to the mountains above because of the heat. It is always the weaker ones that are the first to make the move at either extreme, for example the mackerel before the tunny

^a The pygmy humans and horses, whose existence Arist. accepts here, are regular "kinds" (γένος 597a8) and therefore are not connected with the "pygmies" described at GA II 749a4, which are occasional deformities.

^b The Struma (in Thrace) and the Danube.

^c The alternative reading, "those in front become invisible to those behind", implies that those in front are aware of this and therefore wait for those behind to see them.

² β L^{rec.} Guil. Ald.: τοὺς προτέρους τοῖς ὑστερίους C^a Gaza Bl.

νων· τὰ μὲν γὰρ μεταβάλλει τοῦ Βοηδρομιῶνος
 τὰ δὲ τοῦ Μαιμακτηριῶνος. ἔστι δὲ πióτερα
 25 πάντα ὅταν ἐκ τῶν ψυχρῶν τόπων μεταβάλλῃ ἢ
 ὅταν ἐκ τῶν θερμῶν, οἷον καὶ οἱ ὀρτυγες τοῦ φθι-
 νοπώρου μᾶλλον ἢ τοῦ ἔαρος. συμβαίνει δ' ἐκ
 τῶν ψυχρῶν τόπων ἅμα μεταβάλλειν καὶ ἐκ τῆς
 ὥρας τῆς θερμῆς. ἔχουσι δὲ καὶ πρὸς τὰς ὀχείας
 ὀρμητικώτερον κατὰ τὴν ἔαριν ἤν ὥραν καὶ ὅταν
 30 μεταβάλλωσιν ἐκ τῶν θερμῶν. τῶν μὲν οὖν
 ὀρνέων αἱ γέρανοι, καθάπερ εἴρηται πρότερον,
 ἐκτοπίζουσιν εἰς τὰ ἔσχατα ἐκ τῶν ἐσχάτων.
 597b πέτονται δὲ πρὸς τὸ πνεῦμα. τὸ δὲ περὶ τοῦ
 λίθου ψευδός ἐστι· λέγεται γὰρ ὡς ἔχουσιν ἔρμα
 λίθον ὃς γίνεταί χρησίμος πρὸς τὰς τοῦ χρυσοῦ
 βασάνους ὅταν ἐκπέσῃ.¹

ἀπαίρουσι δὲ καὶ αἱ φάτται καὶ αἱ πελειάδες
 καὶ οὐ χειμάζουσι, καὶ αἱ χελιδόνες καὶ αἱ τρυγό-
 5 νες· αἱ δὲ περιστέραὶ καταμένουσιν. ὁμοίως δὲ
 καὶ οἱ ὀρτυγες, ἔαν μὴ τινες ὑπολειφθῶσι καὶ
 τῶν τρυγόνων καὶ τῶν ὀρτύγων ἐν εὐηλίοις²
 χωρίοις. ἀγελάζονται δ' αἱ τε φάτται καὶ αἱ

¹ ἐκπέσῃ A^arec. F^a X^c β γ (exc. om. in lac. K^c) Ald.: ἀνεμέ-
 σωσιν C^a Sn. Bk.: ἀν ἐμέσωσιν A^apr. G^a Q Ott.: uomitant
 Scot.: euomuerint Guil.: deciderit Gaza

² εὐήλοισ C^apr.: εὐείλοισ C^arec. A^apr. G^a Q Bk. Dt.

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and the quails before the cranes: the former move in Boedromion, the latter in Maimakterion.^a All are fatter when they move out of the cold places than out of the warm, for example the quails are fatter in autumn than in spring. But it happens that the move from the cold places coincides with the ending of the warm season. Also they have more impulse towards mating in the spring season and when they move out of the warm places. Now among the birds the cranes, as was said earlier,^b migrate from the farthest points to the farthest. They fly into the wind. The report about the stone is false: the report is that they contain a stone as ballast, which when it falls out becomes useful for testing gold.

The wood pigeons and the peleias also migrate and do not stay through the winter, also the swallows and the turtle-doves^c; but the common pigeons remain. Similarly quails too migrate, except for any individuals left behind in sunny places, both among quails and among turtle-doves. The wood pigeons

^a Approximately Boedromion = September, Maimakterion = November; see Vol. II, App. B.

^b 597a4.

^c At 593a16 Arist. said that the wood pigeon is always seen whereas the turtle-dove hibernates. But at 600a24 he says that some wood pigeons hibernate while others migrate, and at VIII(IX) 633a5 he says that the wood pigeon is silent in winter except when there is fine weather. These reports suggest independent sources; factually, they can all be reconciled with partial migration.

- τρυγόνες ὅταν τε παραγίνωνται καὶ ὅταν πάλιν¹
 ὥρα ἢ πρὸς τὴν ἀνακομιδὴν. οἱ δ' ὀρτυγες ὅταν
 10 πέσωσιν, ἔαν μὲν εὐδία ἢ βόρειον ἢ, συνδυάζον-
 ταί τε καὶ ἡρεμοῦσιν,² ἔαν δὲ νότος, χαλεπῶς
 ἔχουσι διὰ τὸ μὴ εἶναι πτητικοί· ὑγρὸς γὰρ καὶ
 βαρὺς ὁ ἄνεμος· διὸ καὶ οἱ θηρεύοντες ἐπιχειροῦσι
 τοῖς νοτίοις. εὐδίας δ' οὐ πέτονται διὰ τὸ
 15 πέτονται· πονοῦσι γάρ. ὅταν μὲν οὖν ἐκείθεν
 παραβάλλωσιν, οὐκ ἔχουσιν ἡγεμόνας· ὅταν δ'
 ἐντεῦθεν ἀπάρωσιν,³ ἢ τε γλωττὶς συναπαίρει
 καὶ ἡ ὀρτυγομήτρα καὶ ὁ ὠτὸς καὶ ὁ κύχραμος,
 ὅσπερ αὐτοὺς καὶ ἀνακαλεῖται νύκτωρ· καὶ ὅταν
 τούτου τὴν φωνὴν ἀκούσωσιν οἱ θηρεύοντες,
 ἴσασιν ὅτι οὐ καταμένουσιν. ἢ δ' ὀρτυγομήτρα
 20 παραπλήσιος τὴν μορφήν τοῖς λιμναίοις ἔστί, καὶ
 ἡ γλωττὶς γλῶτταν ἐξαγομένην ἔχουσα μέχρι
 πόρρω. ὁ δ' ὠτὸς ὅμοιος ταῖς γλαυξὶ καὶ παρὰ⁴
 τὰ ὦτα πτερύγιον⁵ ἔχων· ἐνιοὶ δ' αὐτὸν νυκτι-
 κόρακα καλοῦσιν. ἔστι δὲ κοβάλος καὶ μιμητής,
 καὶ ἀντορχούμενος ἀλίσκεται περιελθόντος θατέ-

¹ πάλιν ὅταν transp. a Bk.

² β γ A^arec. F^a X^c Ald.: εὐήμεροισιν C^a A^apr. G^a Q Guil.
Gaza edd.

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and the turtle-doves form flocks both when they arrive and again for their departure when the season comes. When the quails have landed,^a if it is good weather or a north wind they pair off and are quiet, but if it is a south wind they are in difficulties through not being good fliers; for the wind is wet and heavy. Hence the hunters try for them during south winds. But in good weather they avoid flying because of their weight; for their body is bulky, hence they scream while flying, for they are suffering. Now when they make landfall from overseas they do not have leaders; but as they set off from this side the glottis sets off with them, together with the quail-mother and the eared owl and the kuchramos which actually summons them during the night; and when the hunters have heard its voice they know the quails are not remaining. The quail-mother is like the marsh-birds in form, and the glottis has a tongue that it puts out a long way. The eared owl resembles the owls and has tufts by the ears; some call it night-raven. It is a trickster and mimic, and is caught when dancing in response to a hunter dancing while a second hunter goes

^a Lit. "fallen": quails arrived in huge flocks and fell exhausted to the ground in heaps (O. T. *Numbers* XI 31; Rogers *Aristoph. Birds* p. lvi).

³ ἀπαίρωσιν α Cs. Bk.

⁴ C^a β L^c rec. : περι cett. Ald. edd.

⁵ πτερύγια α γ Ald. Bk.

25 ρου τῶν θηρευτῶν, καθάπερ¹ γλαύξ. ὅλως δὲ τὰ
γαμφώνυχα πάντα βραχυτράχηλα καὶ πλατύ-
γλωττα καὶ μιμητικά· καὶ γὰρ τὸ Ἰνδικὸν ὄρ-
νεον ἢ ψιττάκη, τὸ λεγόμενον ἀνθρωπόγλωττον,
τοιούτὸν ἔστι· καὶ ἀκολαστότερον δὲ γίνεται
ὅταν πίνῃ οἶνον.

ἀγελαῖοι δὲ τῶν ὀρνίθων εἰσὶ γέρανος κύκνος
30 πελεκὰν χὴν ὁ μικρός.

XIII τῶν δ' ἰχθύων οἱ μὲν, ὥσπερ εἴρηται, μετα-
βάλλουσι πρὸς τὴν γῆν ἐκ τοῦ πελάγους καὶ εἰς
598a τὸ πέλαγος ἀπὸ τῆς γῆς, φεύγοντες τὰς ὑπερ-
βολὰς τοῦ ψύχους καὶ τῆς ἀλέας. ἀμείνους δ'
εἰσὶν οἱ πρόσγειοι τῶν πελαγίων· πλείω γὰρ καὶ
βελτίω νομὴν ἔχουσιν· ὅπου γὰρ ἂν ὁ ἥλιος
ἐπιβάλλῃ, φύεται πλείω² καὶ βελτίω καὶ ἀπαλώ-
5 τερα, οἷον ἐν κήποις. καὶ ὁ θῆς ὁ μέλας φύεται
πρὸς τῇ γῇ, ὁ δ' ἄλλος ὁμοίός ἐστι τοῖς ἀγρίοις.
ἔτι δὲ καὶ κεκραμένοι τυγχάνουσι καλῶς τῷ
θερμῷ καὶ τῷ ψυχρῷ οἱ τόποι οἱ πρόσγειοι τῆς
θαλάττης· διὸ καὶ αἱ σάρκες συνεστᾶσι μᾶλλον
τῶν τοιούτων ἰχθύων, τῶν δὲ πελαγίων ὑγραί
10 εἰσι καὶ κεχυμένοι. εἰσὶ δὲ πρόσγειοι συνώδων³
κάνθαρος ὀρφὸς χρύσοφρυς κεστρεὺς τρίγλη κίχλη

¹ καθάπερ ἢ α Bk.

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round behind it, just as an owl is caught. In general all the crook-taloned birds are short-necked and flat-tongued and given to mimicry. For such too is the Indian bird, the parrot, that is said to be human-tongued (and it becomes even more outrageous after drinking wine).

Flocking birds include crane, swan, pelican, the small goose.

Among the fishes, some as we have said^a move towards the land from the deep sea and to the deep sea from the land, avoiding the excesses of the cold and warmth. Inshore fishes are better than deep-sea, for their feeding is more abundant and better; for wherever the sun falls on plants they grow more abundant and better and tenderer, as in gardens. And the black mud^b grows near the land, while the rest is like the wild sorts. Also there exists a good blend of the hot and the cold in the inshore regions of the sea; this is in fact why the flesh of such fishes is more compact, while that of the deep-sea fishes is watery and flaccid. Inshore are synodon, black bream, sea-perch, gilthead, grey mullet, red mullet,

XIII

^a 597a14ff.

^b θῖς is taken to mean a plant by LSJ and some edd., but this is doubtful. The "wild" mud will be that which occurs naturally, distinct from the black and nutritious mud which is found inshore. Cf. VIII(IX) 620a15.

² β γ Ald.: πλείω γίνεται α: πλείω φύεται Bk.

³ β (exc. συνόδων O^c T^c) γ Ald.: συνόδων καὶ α: synodon Guil.

δράκων καλλιώνυμος κωβίδος καὶ τὰ πετραῖα
 πάντα· πελάγιοι δὲ τρυγῶν καὶ τὰ σελάχη καὶ
 γόγγροι οἱ λευκοὶ χάννη ἐρυθρῖνος γλαῦκος· φά-
 γροι δὲ καὶ σκορπίοι καὶ γόγγροι οἱ μέλανες καὶ
 15 μύραιναι καὶ κόκκυγες ἐπαμφοτερίζουσιν. εἰσὶ
 δὲ διαφοραὶ τούτων καὶ κατὰ τοὺς τόπους,
 οἷον περὶ Κρήτην οἱ κωβιοὶ καὶ τὰ πετραῖα
 πάντα πλῖον γίνεται. γίνεται δὲ καὶ ὁ θύννος
 ἀγαθὸς πάλιν μετ' Ἀρκτοῦρον· ἥδη γὰρ οἰστρῶν
 παύεται ταύτην τὴν ὥραν· διὰ γὰρ τοῦτο ἐν τῷ
 θέρει χείρων ἐστίν.

20 γίνονται δὲ καὶ ἐν ταῖς λιμνοθαλάτταις πολλοὶ
 τῶν ἰχθύων, οἷον σάλπαι χρύσοφρυς τρίγλη καὶ
 τῶν ἄλλων σχεδὸν οἱ πλεῖστοι. γίνονται δὲ καὶ
 ἄμμαι, οἷον περὶ Ἀλωπεκόννησον· καὶ ἐν τῇ
 Βιστωνίδι λίμνῃ ἔνεστι τὰ¹ γένη τῶν ἰχθύων.

τῶν δὲ κολίων² οἱ πολλοὶ εἰς μὲν τὸν Πόντον
 25 οὐκ ἐμβάλλουσιν, ἐν δὲ τῇ Προποντίδι θερίζουσι
 καὶ ἐντίκτουσι,³ χειμάζουσι δ' ἐν τῷ Αἰγαίῳ.
 θυννίδες δὲ καὶ πηλαμύδες καὶ ἄμμαι εἰς τὸν
 Πόντον ἐμβάλλουσιν τοῦ ἔαρος καὶ θερίζουσιν,
 σχεδὸν δὲ καὶ οἱ πλεῖστοι τῶν ῥυάδων καὶ ἀγε-
 λαίων ἰχθύων. εἰσὶ δ' οἱ πλεῖστοι ἀγελαῖοι.

¹ τὰ πλεῖστα a mrec. Guil. Gaza Cs. Bk.

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wrasse, weever, kallionymos, goby, and all the rock fishes. Deep-sea are sting-ray and the selachians and the white congers, channa, erythrinus, glaucus. But braise, scorpion-fish, the black congers, muraena, cuckoo-fish, tend to both sorts. And there are differences among these fishes in respect of locality too, for example around Crete the gobies and the rock fishes all grow fat. And the tunny becomes good again after Arcturus^a; for by that season it ceases to suffer from the parasite^b which causes it to be worse in summer.

Many of the fishes occur in the sea-lagoons too, for example saupe, gilthead, red mullet, and pretty well most of the others. The bonito occurs also, for example around Alopeconnesus^c; and in the Bistonis^d lagoon there are the fish kinds.

Most coly-mackerel do not enter the Pontus but spend the summer in the Propontis and produce their young there, and winter in the Aegean. Tunnies, pelamyds and bonitos enter the Pontus in spring and spend the summer there, and so do practically the majority of the shoaling and gregarious fishes. Most fishes are gregarious. And the gregari-

^a The morning rising in mid-September; cf. Vol. II, App. A p. 398. ^b Cf. V 557a27, VII(VIII) 599b26, 602a25.

^c On the west coast of the Thracian Chersonese.

^d On the Thracian coast near Abdera.

² β Prec. L^{rec.} Ald.: κολιῶν α mrec.: κοιλίαν γ: κολιῶν edd. ³ ἐκτίκτουσι γ Ald. Bk. Dt.

- 30 ἔχουσι δ' οἱ ἀγελαῖοι ἡγεμόνα.¹ πάντες δὲ εἰσ-
 πλέουσι² εἰς τὸν Πόντον διὰ τε τὴν τροφήν (ἡ
 γὰρ νομὴ καὶ πλείων καὶ βελτίων διὰ τὸ πότι-
 598b μον), καὶ τὰ θηρία³ τὰ μεγάλα ἐλάττω· ἔξω γὰρ
 δελφῖνος καὶ φωκαίνης οὐδέν ἐστιν ἐν τῷ Πόντῳ,
 καὶ ὁ δελφὶς μικρός· ἔξω δ' εὐθύς προελθόντι
 μεγάλοι. διὰ τε δὴ τὴν τροφήν εἰσπλέουσι καὶ
 διὰ τὸν τόκον· τόποι γάρ εἰσιν ἐπιτήδευοι εἰς τὸ
 5 τίκτειν,⁴ καὶ τὸ πότιμον καὶ τὸ γλυκύτερον ὕδωρ
 ἐκτρέφει τὰ κνήματα. ὅταν δὲ τέκωσι καὶ τὰ
 γεννώμενα⁵ αὐξηθῇ, ἐκπλέουσιν εὐθύς μετὰ
 Πλειάδα. ἂν μὲν οὖν νότιος ὁ χειμῶν ᾗ, βραδύ-
 τερον ἐκπλέουσιν, ἂν δὲ βόρειος, θάττον διὰ τὸ
 τὸ πνεῦμα συνεπουρίζειν. καὶ ὁ γόνος δὲ τότε
 10 μικρὸς ἀλίσκεται περὶ Βυζάντιον ἅτε οὐ γενομέ-
 νης ἐν τῷ Πόντῳ πολλῆς⁶ διατριβῆς. οἱ μὲν οὖν
 ἄλλοι καὶ ἐκπλέοντες καὶ εἰσπλέοντες δῆλοί
 εἰσιν, οἱ δὲ τριχίαι μόνοι τῶν ἰχθύων⁷ εἰσπλέον-
 τες μὲν ἀλίσκονται, ἐκπλέοντες δ' οὐχ ὁρῶνται,
 ἀλλὰ καὶ ὅταν ληφθῇ τις περὶ Βυζάντιον οἱ ἀλι-
 15 εἰς τὰ δίκτυα περικαθαίρουσι διὰ τὸ μὴ εἰωθέναι

¹ ἡγεμόνας α Guil. Bk. Dt.

² πάντες. εἰσπλέουσι δ' transp. α Guil. Bk. Dt.

³ θηρία δὲ α Bk. Dt.

⁴ εἰς τὸ τίκτειν β γ Ald.: ἐντίκτειν C^a Sn.: ἐν τῷ τίκτειν α

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ous have a leader. They all swim into the Pontus both because of the food (for the feeding is both more plentiful and better because of the fresh water), and because the large savage fishes are fewer: for apart from dolphin and porpoise there is none in the Pontus, and the dolphin is a small one; but as soon as you go outside you meet large ones. Now they swim in both for the food and for giving birth; for there are places suitable for having young, and the fresh water and the sweeter water complete the nourishing of the embryos. Now when they have given birth and the offspring have grown, they swim out immediately after the Pleiad.^a Now if the winter wind is southerly, they swim out more slowly; if northerly, they go quicker because the wind blows with them. Further, the young which are caught then off Byzantium are small, as having not spent long in the Pontus. Now whereas the others are seen both leaving and entering, the trichiae are the only fishes that are caught on the way in but not seen swimming out; in fact when one is caught off Byzantium the fishermen clean out the nets because

^a Presumably the morning setting in early November which marked the beginning of winter (Hipp. *regimen* III 68, VI 594 L). Some edd. take it as the evening rising, at the end of September. (See Vol. II, p. 399.)

⁵ γενόμενα C^a Prec. Bk.

⁶ πολλῆς post γενομένης transp. α Bk.

⁷ τῶν λιθύων om. α Bk.

ἐκπλεῖν. αἴτιον δ' ὅτι οὗτοι μόνοι ἀναπλέουσιν
 εἰς τὸν Ἰστρον, εἰθ' ἥ σχίζεται καταπλέουσιν εἰς
 τὸν Ἀδρίαν. σημεῖον δέ, καὶ¹ γὰρ συμβαίνει
 τοῦναντίον· εἰσπλέοντες μὲν γὰρ οὐχ ἀλίσκονται
 εἰς τὸν Ἀδρίαν, ἐκπλέοντες δ' ἀλίσκονται. εἰσ-
 πλέουσι δ' οἱ θύννοι ἐπὶ δεξιὰ ἐχόμενοι τῆς γῆς,
 20 ἐκπλέουσι δὲ ἐπ' ἀριστερά· τοῦτο δὲ φασί τινες
 ποιεῖν ὅτι τῷ δεξιῷ ὀξύτερον ὁρῶσι, φύσει οὐκ
 ὀξὺ βλέποντες.

τὴν μὲν οὖν ἡμέραν οἱ ῥυάδες κομίζονται, τὴν
 δὲ νύκτα ἡσυχάζουσι καὶ νέμονται ἐὰν μὴ σελήνη
 ᾖ· τότε δὲ κομίζονται καὶ οὐχ ἡσυχάζουσιν. λέ-
 25 γουσι δέ τινες τῶν περὶ τὴν θάλατταν ὥς ὅταν
 τροπαὶ χειμεριναὶ γίνωνται οὐκέτι κινοῦνται ἀλλ'
 ἡσυχάζουσιν, ὅπου ἂν τύχῃσι καταλειφθέντες,²
 μέχρι ἰσημερίας.

οἱ μὲν οὖν κολῖαι εἰσπλέοντες ἀλίσκονται, ἐξι-
 όντες δ' ἦττον· ἄριστοι δ' εἰσὶν ἐν τῇ Προποντίδι
 πρὸ τοῦ τίκτειν. οἱ δ' ἄλλοι ῥυάδες ἐξιόντες
 30 ἐκ τοῦ Πόντου ἀλίσκονται τε καὶ μᾶλλον³ ἄριστοι
 τότε εἰσὶν· ὅταν δὲ εἰσπλέωσιν, ἐγγύτατα τοῦ

¹ β γ Ald.: ἐκεῖ α Bk.

² καταληφθέντες L^c m n Ald. Guil. Bk.

³ τε καὶ μᾶλλον β γ Ald.: μᾶλλον καὶ α Gaza Cs. Bk.

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it is unusual for them to swim out. The cause is that these are the only fishes to swim up the Ister, and then where it divides they swim down into the Adriatic.^a Evidence of this is that the result is the opposite: for they are not caught swimming inwards into the Adriatic, but are caught swimming out. The tunny swim inwards while keeping to the right-hand shore, but swim out keeping to the left^b shore; some say they do this because they see more sharply with the right eye, not having sharp sight by nature.

Now the shoal fishes travel by day, but at night they rest and feed if there is no moon; but if there is, they travel and do not rest. Some coast dwellers say that at the winter solstice they cease moving and rest wherever they happen to be left, until the equinox.

Now the coly-mackerel are caught while swimming in,^c but less often while going out. They are best in the Propontis before giving birth. But the other shoal fishes are both caught while leaving the Pontus and tend to be best then. When they are

^a This supposed link with the Adriatic was the mythical route of the Argonauts, Ap. Rhod. IV 282 ff; cf. Strabo I 2. 39 (46). Pliny III 18. 128 denies its existence, but says at IX 20. 53 that the sardines reach the Adriatic from the Danube by subterranean channels. At 598b18 εἰς τὸν Ἀδρίαν refers to the southern end of the Adriatic.

^b From our viewpoint. Cf. Pliny IX 20. 50, Plut. *soll. anim.* 979E, Aelian IX 42 (both the latter quoting Aesch. fr. 308).

^c From the Aegean; cf. 598a24.

599a Αἰγαίου¹ πιότατοι ἀλίσκονται, ὅσα δ' ἀνωτέρω,
 αἰεὶ λεπτότεροι. πολλάκις δὲ καὶ ὅταν πνεῦμα
 ἀντικόψῃ νότιον ἐκπλέουσι τοῖς κολλίοις² καὶ τοῖς
 σκόμβροις, κάτω ἀλίσκονται μᾶλλον ἢ περὶ Βυ-
 ζάντιον.

τοὺς μὲν οὖν ἐκτοπισμοὺς τοῦτον ποιοῦνται τὸν
 τρόπον.

- 5 τὸ δ' αὐτὸ τοῦτο συμβαίνει πάθος καὶ ἐπὶ τῶν
 χερσαίων κατὰ τὴν φωλείαν· τοῦ μὲν γὰρ χει-
 μῶνος ὁρμῶσι πρὸς τὴν φωλείαν, ἀπαλλάττονται
 δὲ κατὰ τὴν θερμότεραν ὥραν. ποιοῦνται δὲ τὰ
 ζῶα καὶ τὰς φωλείας πρὸς τὴν βοήθειαν καὶ τὰς
 ὑπερβολὰς τῆς ὥρας ἐκατέρας. φωλεῖ δὲ τῶν
 10 μὲν ὅλον τὸ γένος, ἐνίων δὲ τὰ μὲν τὰ δ' οὔ. τὰ
 μὲν γὰρ ὀστρακόδερμα πάντα φωλεῖ, οἷον τά τε
 ἐν τῇ θαλάττῃ, πορφύραι καὶ κήρυκες καὶ πᾶν τὸ
 τοιοῦτον γένος· ἀλλὰ τῶν μὲν ἀπολελυμένων
 ἐπιδηλότερός ἐστιν ἡ φωλεία (κρύπτουσι γὰρ
 αὐτά, οἷον οἱ κτένες, τὰ δ' ἴσχει ἐπιπολῆς ἐπικά-
 15 λυμμα, οἷον οἱ χερσαῖοι κοχλῖαι), τῶν δ' ἀναπο-
 λύτων ἄδηλος ἡ μεταβολή. φωλοῦσι δ' οὐ τὴν

¹ C^a A^{ap}r. G^a F^arec. O^crec. mrec. Scot. Guil. Gaza: αἰγια-
 λοῦ A^arec. β γ Ald. Bk.

² κολλίοις sive κολιοῖς cett.: κολοιοῖς A^a G^arec. Q F^a X^c:
 κολῖαις conl. Sylb. edd. (cf. 598b27)

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swimming in, those caught nearest the Aegean^a are fattest; and the farther up they are, the thinner. Often when a wind blows from the south against the coly-mackerel and the mackerel as they swim out, catches^b are better farther down than off Byzantium.

This then is the way they make their migrations.

Land animals have the same experience in regard to hiding themselves^c: in winter they have an impulse to go into hiding, and leave it in the warmer season. The animals also go into hiding additionally for protection against the excesses of either season. In some cases the whole kind hides, but in others some do and some do not. For the testaceans all hide, for example those in the sea, purpuras and trumpet-shells and all of such a kind. But the hiding is more obvious in the case of the detached animals (for they conceal themselves, as the scallops do, or they have a covering over their surface like the land snails), while in the undetached animals the change is inconspicuous. They do not hide at the

^a Bk. and many edd. prefer the variant "shore" (cf. 598a2). In that case 598b31 *ἀνωτέρω* will mean "farther out to sea", as it often does.

^b That is, of other fishes to the south, when the mackerel have been held up by the south wind and have not yet reached Byzantium; cf. 598b7.

^c Arist. uses *φωλεία*, *φωλεῖν* and *φωλεῖεν* of both hibernation and aestivation.

αὐτὴν ὥραν, ἀλλ' οἱ μὲν κοχλῖαι τοῦ χειμῶνος, αἱ δὲ πορφύραι καὶ οἱ κήρυκες ὑπὸ κύνα περὶ ἡμέρας τριάκοντα, καὶ οἱ κτένες περὶ τὸν αὐτὸν χρόνον. τὰ δὲ πλεῖστα αὐτῶν φωλεῖ καὶ ἐν τοῖς σφόδρα ψύχεσι καὶ ἐν ταῖς σφόδρα ἀλέαις.

- XIV τὰ δ' ἔντομα σχεδὸν ἅπαντα φωλεῖ, πλὴν εἴ τι ἐν ταῖς οἰκήσεσι συνανθρωπεύεται αὐτῶν καὶ ὅσα φθείρεται καὶ μὴ διετίζει. ταῦτα δὲ φωλεῖ τοῦ χειμῶνος. φωλεῖ δὲ τὰ μὲν πλείους ἡμέρας, τὰ δὲ τὰς χειμεριωτάτας, οἷον αἱ μέλιτται· καὶ γὰρ αὗται φωλοῦσιν. σημεῖον δ' ὅτι οὐδὲν φαίνονται γεγόμεναι τῆς παρακειμένης τροφῆς· καὶ ἔάν¹ τις αὐτῶν ἐξερπύσῃ, φαίνεται διαφανῆς καὶ οὐθὲν ἐν τῇ κοιλίᾳ ἐνὸν δηλόν. ἡσυχάζει δ' ἀπὸ Πλειάδος δύσεως μέχρι τοῦ ἔαρος.

- 30 ποιεῖται δὲ τὰ ζῶα τὰς φωλείας ἀποκρυπτόμενα ἐν ἀλεεινοῖς καὶ ἐν οἷς εἴωθε τόποις ἐπικοιτάζεσθαι.

- XV φωλεῖ δὲ καὶ τῶν ἐναίμων πολλά, οἷον τὰ τε φολιδωτά, ὄφεις τε καὶ σαῦραι καὶ ἀσκαλαβῶται καὶ κροκόδειλοι οἱ ποτάμιοι, τέτταρας μῆνας τοὺς χειμεριωτάτους, καὶ οὐκ ἐσθίουσιν οὐδέν. οἱ μὲν οὖν ἄλλοι ὄφεις ἐν τῇ γῇ φωλευοῦσιν,² οἱ δ' ἔχιδναι ὑπὸ τὰς πέτρας κατακρύπτουσιν³ ἑαυτάς.

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same season, but the snails in winter, the purpuras and trumpet-shells at the dog-star^a for about thirty days, and the scallops at about the same time. And most of them hide also in the extreme cold and extreme hot spells.

The insects practically all hide, except for any XIV
that live with humans in houses and those that die and do not live through to the next year. Insects hide in the winter. Some hide for a number of days, others for the wintriest days, for example the bees. For they too hide. Evidence of this is that they are not seen at all to taste the food set out for them; and if one does creep out, it looks transparent and there is evidently nothing in its stomach. Bees are quiet from the setting of the Pleiad^b until the spring.

The animals do their hiding by concealing themselves in warm places and in places where they are accustomed to go for sleep.

Among the blooded animals many also hide, for XV
example the horny-scaled—snakes, lizards, geckos, the river crocodiles—for the four most wintry months, and do not eat anything. Now while the other snakes hide in the ground, the vipers conceal themselves underneath rocks.

^a The morning rising in mid-July, regarded as introducing the time of greatest heat ("dog days").

^b The morning setting in early November.

¹ καὶ ἐὰν] κᾶν α Bk. ² φωλοῦσιν α Bk.

³ ἀποκρύπτουσιν α Bk.: κρύπτουσιν L^c m n Ald.

φωλοῦσι δὲ πολλοὶ καὶ τῶν ἰχθύων, ἐμφανέ-
 τατα¹ δ' Ἴππουρος καὶ κορακῖνος τοῦ χειμῶνος·
 οὗτοι γὰρ μόνοι οὐχ ἀλίσκονται οὐδαμοῦ πλὴν
 5 κατὰ τινας χρόνους τακτοὺς καὶ τοὺς αὐτοὺς αἰεί,
 τὰ δὲ λοιπὰ πάντα φωλεῖ² σχεδόν. φωλοῦσι³ δὲ
 καὶ μύραινα καὶ ὀρφὸς καὶ γόγγρος. κατὰ συζυ-
 γίας δ' οἱ πετραῖοι φωλευοῦσιν⁴ οἱ ἄρρενες τοῖς
 θήλεσιν ὥσπερ καὶ νεοττεύουσιν, οἷον κίχλαι κότ-
 τυφοὶ πέρκαι. φωλοῦσι δὲ καὶ οἱ θύννοι τοῦ χει-
 10 μῶνος ἐν τοῖς βαθέσι, καὶ γίνονται πιότατοι μετὰ
 τὴν φωλείαν, καὶ ἄρχονται θηρεύεσθαι ἀπὸ Πλει-
 άδος ἀνατολῆς μέχρι Ἀρκτούρου δύσεως τὸ
 ἔσχατον· τὸν δ' ἄλλον χρόνον ἡσυχίαν ἔχουσι
 φωλοῦντες. ἀλίσκονται δ' ἔνιοι περὶ τὸν χρόνον
 τῆς φωλείας καὶ τούτων καὶ τῶν ἄλλων τινὲς
 τῶν φωλούντων κινούμενοι ἂν ἀλεεινὸς ἦ ὁ
 15 τόπος καὶ ἐπιγίνωνται εὐδῖαι παράλογοι· ἀπὸ
 γὰρ τῆς θαλάμης προέρχονται μικρὸν ἐπὶ νομήν·
 καὶ ταῖς πανσελήνοις. εἰσὶ δ' οἱ πολλοὶ φωλοῦν-
 τες ἡδιστοί. αἱ δὲ πριμαδίαι⁵ κρύπτουσιν ἑαυτὰς
 ἐν τῷ βορβόρῳ· σημεῖον δὲ τό τε μὴ ἀλίσκεσθαι
 καὶ ἰλὺν δ'⁶ ἔχουσαι⁷ ἐν τῷ νώτῳ⁸ φαίνεσθαι

¹ ἐπιφανέστατα a Bk. ² om. a γ (exc. L^{rec.}) Cs. edd.

³ β E^a P K^c M^c: φωλεύουσι L^c m n Ald.: φωλεῖ a Cs. edd.

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Many of the fishes hide too, most noticeably hippurus and coracinus in winter; for these are the only ones that are not caught anywhere except at certain fixed times which are always the same in duration, and the others nearly all go into hiding. Muraena, sea-perch and conger also hide. The rock fishes pair off, males with females, for hiding just as for having young, for example wrasse, merula, perch. The tunny too hide during the winter in deep water, and become fattest after hiding, and begin to be hunted from the rising of the Pleiad until the setting of Arcturus^a at the latest; the rest of the time they keep quiet in hiding. But some of them, together with individuals from among other fishes that hide, are caught during the hiding period because they move, if the place is warm and if abnormally good weather supervenes; for they emerge out of their lair a little way to feed; they do it also at full moon. Most fishes are best when hiding. The primadiae^b conceal themselves in the mud; a sign of this is the fact that they are not caught, and also that they appear with a good deal of mud on the back and with

^a The morning rising of the Pleiads (early May), the evening setting of Arcturus (end October).

^b First-year tunny.

⁴ φωλοῦσιν α Bk.

⁵ πριμάδες α Guil. Bk.

⁶ om. α Sn. Bk.

⁷ β L^c rec. Ald.: ἐχούσας α Sn. Bk.: ἔχουσιν γ

⁸ ἐν τῷ νώτῳ (sive νότῳ) β γ Ald.: ἐπὶ τοῦ νώτου α Sn. Bk.

20 πολλήν καὶ τὰ πτερύγια ἐντεθλιμμένα. κατὰ δὲ
 τὴν εἰρημένην¹ ὥραν κινοῦνται καὶ προέρχονται
 πρὸς τὴν γῆν ὀχευόμεναι καὶ τίκτουςαι, καὶ ἀλίσ-
 κονται κύοντες.² καὶ τότε ὠραῖοι δοκοῦσιν³
 εἶναι, οἳ δὲ μετοπωρινοὶ καὶ χειμερινοὶ χείρους·
 ἅμα δὲ καὶ οἱ ἄρρενες φαίνονται πλήρεις ὄντες
 25 θόρου. ὅταν μὲν οὖν μικρὰ τὰ κυήματ' ἔχωσι,
 δυσάλωτοί εἰσιν, ὅταν δὲ μείζω, πολλοὶ ἀλίσκον-
 ται διὰ τὸ οἰστρᾶν. φωλεῖ δὲ τὰ μὲν ἐν τῇ ἄμμῳ
 τὰ δ' ἐν τῷ πηλῷ, ὑπερέχοντα τὸ στόμα μόνον.

τὰ μὲν οὖν⁴ πλείστα φωλεῖ τοῦ⁵ χειμῶνος, τὰ
 δὲ μαλακόστρακα καὶ τῶν ἰχθύων οἱ πετραῖοι
 καὶ βάτοι καὶ τὰ σελαχώδη τὰς χειμεριωτάτας
 30 ἡμέρας· δηλοῖ δὲ τὸ μὴ ἀλίσκεσθαι ὅταν ᾖ ψύχη.
 ἔνιοι δὲ τῶν ἰχθύων φωλοῦσι καὶ τοῦ θέρους, οἷον
 γλαῦκος· οὗτος γὰρ τοῦ θέρους φωλεῖ περὶ ἐξή-
 κονθ' ἡμέρας. φωλεῖ δὲ καὶ ὁ ὄνος καὶ ὁ χρύσο-
 600a φρυς· σημεῖον δὲ δοκεῖ εἶναι τοῦ τὸν ὄνον πλεῖ-
 στον φωλεῖν χρόνον τὸ διὰ πλείστου ἀλίσκεσθαι
 χρόνου.⁶ τοῦ δὲ καὶ θέρους τοὺς ἰχθύς φωλεῖν δοκεῖ

¹ ἐαρινήν mrec. Gaza coni. Scal. Cs. Sn. Bk.

² κύουσai L^c m n Ald. Sn. Bk.

³ δοκ. ὡρ. transp. α Bk.

⁴ om. Bk. (typ. err.)

⁵ ante τοῦ add. μόνον α Gaza Sn. Bk.

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the fins chafed. But at the season mentioned^a they start moving and proceed towards land, mating and having young, and are caught full of eggs. That is when they are held to be in season, while the autumn and winter ones are thought inferior; at the same time too the males are seen to be full of milt. Now when the spawn that they contain is small, they are hard to catch, but when it is bigger many are caught because they are goaded by the parasite.^b Some fishes hide in the sand, others in the mud, with only the mouth projecting.

Now most of them hide during the winter, and the crustaceans and rock fishes and rays and selachians hide during the wintriest days; this is shown by the fact that they are not caught during cold spells. But some of the fishes hide during the summer too, for example glaucus: this hides in summer for about sixty days. The hake and the gilthead also hide; the long interval between catches of hake is believed to show that it hides for a very long time. And evidence that the fishes hide also during the

^a At 599b10: the rising of the Pleiads in May. The variant would give "of spring" for "mentioned".

^b For the parasite, cf. V 557a27, VII(VIII) 598a18, 602a28. The statement is attributed to Theophrastus by Athen. VI 301E, followed by V. Rose and O. Regenbogen "Theophrastos," *RE* 1429; but Athen.'s source was probably an epitome of Peripatetic biology. (See *Introd.* p. 4 ff.)

⁶ *χρον. ἀλ.* transp. α Bk.

σημείον εἶναι τὸ ἐπὶ τοῖς ἄστροις γίνεσθαι τὰς
 ἀλώσεις, καὶ μάλιστα ἐπὶ κυνί· τηνικαῦτα γὰρ
 5 ἀνατρέπεσθαι τὴν θάλατταν. ὅπερ ἐν τῷ Βοσ-
 πόρῳ γνωριμώτερόν¹ ἐστίν· ἢ γὰρ ἰλὺς ἐπάνω
 γίνεται καὶ ἐπιφέρονται οἱ ἰχθύες. φασὶ δὲ καὶ
 πολλάκις τριβομένου τοῦ βυθοῦ ἀλίσκεσθαι πλεί-
 ους ἐν τῷ αὐτῷ βόλῳ τὸ δεύτερον ἢ τὸ πρῶτον.
 καὶ ἐπειδὴν ὄμβροι μεγάλοι² γένωνται πολλὰ φαί-
 10 νεται ζῶα τῶν πρότερον ἢ ὅλως οὐχ ἑωραμένων ἢ
 οὐ πολλάκις.

XVI φωλοῦσι δὲ πολλοὶ καὶ τῶν ὀρνίθων, καὶ οὐχ ὥς
 τινες οἴονται ὀλίγοι ἢ³ εἰς ἀλεεινοὺς τόπους ἀπέρ-
 χονται πάντες· ἀλλ' οἱ μὲν πλησίον ὄντες τοιού-
 των τόπων ἐν οἷς αἰεὶ διαμένουσι, καὶ ἰκτῖνοι καὶ
 χελιδόνες, ἀποχωροῦσιν ἐνταῦθα, οἱ δὲ πορρωτέρω
 15 ὄντες τῶν τοιούτων οὐκ ἐκτοπίζουσιν ἀλλὰ κρύπ-
 τουσιν ἑαυτοὺς. ἤδη γὰρ ὠμμένοιαι πολλαὶ χελι-
 δόνες εἰσὶν ἐν ἀγγείοις ἐπιλωμένοιαι πάμπαν, καὶ
 ἰκτῖνοι ἐκ τοιούτων ἐκπετόμενοι χωρίων, ὅταν
 φαίνωνται τὸ πρῶτον. φωλοῦσι δ' οὐθὲν διακεκρι-
 μένως καὶ τῶν γαμφωνύχων καὶ τῶν εὐθυωνύ-
 20 χων· φωλεῖ γὰρ καὶ πελαργὸς καὶ κόττυφος καὶ
 τρυγὼν καὶ κόρυδος, καὶ ἢ γε τρυγῶν ὁμολογουμέ-

¹ -τατόν α Bk.

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summer is found in the fact that catches are made at the times of the stars,^a and especially at the dog-star; for at those times the sea is said to be overturned. This in fact can be ascertained better in the Bosphorus; for the mud comes to the top and the fishes are carried up on it. They say too that often when the sea-bottom is being dragged more fishes are caught in the same net at the second draught than at the first. And when there have been heavy rain-storms many of those animals appear that previously have either not been seen at all or not often.

Many of the birds too hide, and it is not, as some think, that few hide or that all migrate to warm places. Some whose permanent residence is near to such places (including kites and swallows) withdraw to them, but others that are farther from such places do not migrate but conceal themselves. For in the past many swallows have been seen in shelters bare of all their feathers, and also kites flying out of such places when they first appear. There is no difference in respect of hiding between the crook-taloned and straight-taloned birds; for among those that hide are the stork, blackbird, turtle-dove, lark; in fact the turtle-dove is the most

XVI

^a This probably means the morning rising of the Pleiades, dog-star and Arcturus, indicating the summer; see note at V 553b30.

² μεγάλοι post γεν. transp. α Bk.: om. Sc

³ ὀλίγοι ἢ om. α Scot. Guil. Cs. Bk.

νως μάλιστα πάντων· οὐθείς γὰρ ὡς εἰπεῖν λέγε-
ται τρυγόνα ἰδεῖν οὐθαμοῦ χειμῶνος. ἄρχεται δὲ
τῆς φωλείας σφόδρα πείρα οὔσα, καὶ πτερορρύνει
μὲν ἐν τῇ φωλείᾳ, παχεῖα μέντοι διατελεῖ οὔσα.
25 τῶν δὲ φασσῶν ἔνιαι μὲν φωλοῦσιν, ἔνιαι δ' οὐ
φωλοῦσιν ἀπέρχονται δ' ἅμα ταῖς χελιδόσιν.
φωλεῖ δὲ καὶ ἡ κίχλη καὶ ὁ ψάρος καὶ τῶν γαμβω-
νύχων ἰκτίνος ὀλίγας ἡμέρας καὶ ἡ γλαύξ.

- XVII τῶν δὲ ζωοτόκων καὶ τετραπόδων φωλοῦσιν οἷ
τε ὕστριχες καὶ αἱ ἄρκτοι. ὅτι μὲν οὖν φωλοῦσιν
30 αἱ ἄγριαι ἄρκτοι φανερόν ἐστι, πότερον δὲ διὰ
ψυχος ἢ δι' ἄλλην αἰτίαν ἀμφισβητεῖται. γίνον-
ται γὰρ περὶ τὸν χρόνον τοῦτον οἱ ἄρρενες καὶ αἱ
θήλειαι πιότατοι, ὥστε μὴ εὐκίνητοι εἶναι. ἡ δὲ
600b θήλεια καὶ τίκτει περὶ τοῦτον τὸν καιρόν, καὶ
φωλεῖ ἕως ἂν ἐξάγειν ὥρα ἢ τοὺς σκύμνους· τοῦτο
δὲ ποιεῖ τοῦ ἔαρος περὶ τρίτον μῆνα ἀπὸ τροπῶν.
τὸ δ' ἐλάχιστον φωλεῖ περὶ τετταράκονθ' ἡμέρας·
τούτων δὲ δις ἐπτὰ λέγουσιν ἐν αἷς οὐδὲν κινεῖται,
5 ἐν δὲ ταῖς πλείοσι ταῖς μετὰ ταῦτα φωλεῖ μὲν κι-
νεῖται δὲ καὶ ἐγείρεται. κύουσα δ' ἄρκτος ἢ ὑπ'
οὐθενὸς ἢ πάνυ ὑπ' ὀλίγων εἴληπται. ἐν δὲ τῷ
χρόνῳ τούτῳ φανερόν ἐστιν ὅτι οὐθὲν ἐσθίουσιν·
οὔτε γὰρ ἐξέρχονται, ὅταν τε ληφθῶσι κενὰ φαίνε-

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generally agreed case, for virtually nobody is said to have seen a turtle-dove anywhere in winter. It begins its hiding while very fat, and though it moults in hiding it nevertheless remains plump. Some wood pigeons hide, some do not hide but depart at the same time as the swallows. The thrush and the starling also hide, and among the crook-taloned birds the kite for a few days and the owl.

Among the viviparous and quadruped both the porcupines and the bears hide. Now the fact that the wild bears hide is evident, but whether it is because of cold or another cause is disputed. For about this time the males and the females become very fat, so that they cannot move easily. The female also gives birth at about this point, and hides until it is the season to bring the cubs out; this she does in spring about the third month after the solstice. The bear hides for about forty days at the least; of these there are twice seven days, they say, during which it does not move at all, but on most of the following days although still hiding it moves and wakes. A pregnant bear has either never been caught or only rarely. During this time it is evident that they eat nothing; for they do not come out, and when they are caught their stomach and intestines

XVII

- ται ἢ τε κοιλία καὶ τὰ ἔντερα. λέγεται δὲ καὶ διὰ
 10 τὸ μηδὲν προσφέρεσθαι τὸ ἔντερον ὀλίγου συμφύ-
 εσθαι αὐτῇ, καὶ διὰ τοῦτο πρῶτον ἐξιούσαν γεύ-
 εσθαι τοῦ ἄρου πρὸς τὸ ἀφιστάναι τὸ ἔντερον καὶ
 διευρύνειν. φωλεῖ δὲ καὶ ὁ ἐλειὸς ἐν αὐτοῖς τοῖς
 δένδρεσι, καὶ γίνεται τότε παχύτατος· καὶ ὁ μῦς ὁ
 Ποντικὸς ὁ λευκός.
- 15 τῶν δὲ φωλούντων ἔνιοι τὸ καλούμενον γῆρας
 ἐκδύνουσιν.¹ ἔστι δὲ τοῦτο τὸ ἔσχατον δέρμα καὶ
 τὸ περὶ τὰς γενέσεις κέλυφος. τῶν μὲν οὖν πεζῶν
 καὶ ζωοτόκων περὶ τῆς ἄρκτου ἀμφισβητεῖται ἡ
 αἰτία τῆς φωλείας, καθάπερ ἐλέχθη πρότερον· τὰ
 20 δὲ φολιδωτὰ φωλεῖ μὲν σχεδὸν τὰ πλείστα, ἐκδύ-
 νει δὲ τὸ γῆρας ὅσων τὸ δέρμα μαλακὸν καὶ² μὴ
 ὀστρακῶδες ὥσπερ τῆς χελώνης (καὶ γὰρ ἡ χε-
 λώνη τῶν φολιδωτῶν ἐστὶ καὶ ὁ ἐμύς) ἀλλ' οἶον
 ἀσκαλαβώτης τε καὶ σαῦρος καὶ μάλιστα πάντων
 οἱ ὄφεις· ἐκδύνουσι γὰρ καὶ τοῦ ἔαρος ὅταν ἐξίωσι
 καὶ τοῦ μετοπώρου πάλιν. ἐκδύνουσι δὲ καὶ οἱ
 25 ἔχεις τὸ γῆρας καὶ τοῦ ἔαρος καὶ τοῦ μετοπώρου,
 καὶ οὐχ ὥσπερ τινές φασι³ τοῦτο τὸ γένος τῶν
 ὄφειων μὴ ἐκδύεσθαι μόνον. ὅταν δ' ἄρχωνται ἐκ-
 δύνειν οἱ ὄφεις, ἀπὸ τῶν ὀφθαλμῶν ἀφίστασθαι

¹ ἐκδύνουσιν α Bk.

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are seen to be empty. It is said also that the bear's gut almost grows together because nothing is put into it, and because of this when she first comes out she eats some arum in order to part and dilate the gut. The dormouse also hides inside the trees, and becomes very fat then; also the white Pontic mouse.^a

Some of the animals that hide cast the so-called "old age"^b: this is the outermost skin, and the casing round a developing animal. Now of the terrestrial and viviparous the cause of the bear's hiding is disputed, as was said before.^c But among the horny-scaled virtually the majority hide, and those of them whose skin is soft and not shelled like that of the tortoise (for both the land tortoise and the freshwater tortoise are among the horny-scaled) cast the "old-age": for example the gecko, lizard, and most of all the snakes; for they cast both in spring when they emerge and again in autumn. The vipers too cast the old-age in both spring and autumn, and it is not the case, as some say, that they are the only kind of snake not to cast. When snakes begin the cast, it is said to come away first from the eyes, so

^a The marmot, according to I. Krumbiegel, *Die Thos-Tiere des Arist.*, *Archeion* XVI (1934) 35. Cf. VIII(IX) 632b9.

^b The slough. Arist. includes also the pupa-case; hence "slough" has not been used in this translation.

^c 600a29.

² καὶ codd. Guil. Ald.: om. Bk. (typ. err.) edd.

³ φασὶ ante τινες transp. α Bk.

πρώτον φασιν,¹ ὥστε δοκεῖν γίνεσθαι τυφλοὺς τοῖς
 μὴ συνιοῦσι² τὸ πάθος· μετὰ δὲ τοῦτο ἀπὸ τῆς κε-
 30 φαλῆς, καὶ λευκὴ φαίνεται πάντων. ἐν νυκτὶ δὲ
 σχεδὸν καὶ ἡμέρα πᾶν ἀποδύεται τὸ γῆρας, ἀπὸ
 τῆς κεφαλῆς ἀρξάμενον μέχρι τῆς κέρκου. γίνε-
 ται δὲ ἐκδυομένου τὰ ἐντὸς ἐκτός· ἐκδύεται
 601a γὰρ ὥσπερ τὰ ἔμβρυα ἐκ τῶν χορίων.

τὸν αὐτὸν δὲ τρόπον καὶ τῶν ἐντόμων ἐκδύνει
 τὸ γῆρας ὅσα ἐκδύνει, οἷον σίλφη καὶ ἀσπὶς³ καὶ
 τὰ κολεόπτερα οἷον κάνθαρος. πάντα δὲ μετὰ
 τὴν γένεσιν ἐκδύεται· ὥσπερ γὰρ τοῖς ζωοτοκου-
 5 μένοις τὸ χόριον καὶ τοῖς σκωληκοτοκουμένοις
 περιρρήγνυται τὸ κέλυφος, ὁμοίως καὶ μελίτταις
 καὶ ἀκρίσιν. οἱ δὲ τέττιγες ὅταν ἐξέλθωσι καθ-
 ιζάνουσιν ἐπὶ τε τὰς ἐλαίας καὶ καλάμους.
 περιρραγέντος δὲ τοῦ κελύφους ἐξέρχονται ἐγκατα-
 λιπόντες ὑγρότητα μικράν, καὶ μετ' οὐ πολὺν
 10 χρόνον ἀναπέτονται καὶ ᾄδουσιν.

τῶν δὲ θαλαττίων οἱ κάραβοι καὶ ἀστακοὶ ἐκδύ-

¹ ἀφίστασθαι φασὶ πρώτον transp. C^a A^apr. G^a Q Ott.: ἀφί-
 σταται πᾶσι πρώτον A^arec. F^a X^c γ Bk. Dt.: ἀφίστασθαι φα
 L^rrec.: ἀφίσταται πρώτον φασιν Ald.: *separare aiunt primo*
 Guil.: *primum detrahi aiunt* Gaza

² συννοοῦσι α Bk. Dt.

³ β γ Ald.: ἐμπὶς α edd.: *ankiz* Scot.: *empys* Guil.: *culex*
 Gaza

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that they seem to be going blind to those who do not understand this happening; after that it comes off the head, and it becomes white in every case. It takes about a night and a day for the whole old-age to be shed, starting from the head and ending at the tail. As the animal is being stripped its inner layer becomes the outer, for it is stripped like embryos of their membranes.

Those insects too that cast the old-age cast it in the same way, for example cockroach, aspis,^a and the sheath-winged insects such as cantharus. And all are stripped after their first development; for like the chorion in those born live, so too in those born as grubs the casing breaks away, alike for bees and grasshoppers too. The cicadas after emerging settle on olive trees and reeds. They emerge when the casing has broken away, leaving in it a little moisture, and not long afterwards they fly up and sing.

Among the marine animals, the crayfish and lob-

^a The variant reading is *ἐμπίς*, "gnat"; Scot.'s *ankiz* could represent either. At I 487b5 the gadfly is said to arise from gnats, obviously a mistake; but there too "aspis" is a MS variant of "gnat", and although aspis is not reported elsewhere as the name of an insect Wimmer defended it at 487b5 because its primary meaning "shield" would suit the description at V 551b21 of "flat creatures" from which the gadfly arises (*Lectiones Arist.* Breslau 1861 p. 9; he did not repeat this suggestion in his edition of *HA* 1868). Clearly "gnat" is unacceptable both here and at 487b5, so there is no alternative to aspis except by rewriting, in which case the field is open: see Peck's note at I 487b8.

- νουσιν ὅτε μὲν τοῦ ἔαρος ὅτε δὲ τοῦ μετοπώρου
μετὰ τοὺς τόκους. ἤδη δ' εἰλημμένοι ἔνιοί εἰσι
τῶν καράβων τὰ μὲν περὶ τὸν θώρακα μαλακὰ
ἔχοντες διὰ τὸ περιερρωγένοι τὸ ὄστρακον, τὰ
δὲ κάτω σκληρὰ διὰ τὸ μήπω περιερρωγένοι·
15 τὴν γὰρ ἔκδυσιν ποιοῦνται οὐχ ὁμοίαν τοῖς
ὄφεσιν. φωλοῦσι δ' οἱ κάραβοι περὶ πέντε μῆνας.
ἐκδύνουσι δὲ καὶ οἱ καρκίνοι τὸ γῆρας, οἱ μὲν
μαλακόστρακοι ὁμολογουμένως, φασὶ δὲ καὶ τοὺς
ὄστρακοδέρμους, οἷον τὰς μαίας. ὅταν δ' ἐκδύνωσι,
γίνονται μαλακὰ¹ πάμπαν τὰ ὄστρακα, καὶ οἱ γε
20 καρκίνοι βαδίζουσιν οὐ σφόδρα δύνανται. ἐκδύνει δὲ
τὰ τοιαῦτα οὐχ ἅπαξ ἀλλὰ πολλάκις.

ὅσα μὲν οὖν φωλεῖ καὶ πότε καὶ πῶς, ἔτι δὲ
ποῖα καὶ πότε ἐκδύνει τὸ γῆρας, εἴρηται.

- XVIII εὐημεροῦσι δὲ τὰ ζῶα κατὰ τὰς ὥρας οὐ τὰς
αὐτάς, οὐδ' ἐν ταῖς ὑπερβολαῖς ὁμοίως ἀπάσαις·
25 ἔτι δ' ὑγίειαι καὶ νόσοι κατὰ τὰς ὥρας τοῖς
ἐτερογενέσιν ἕτεραι καὶ τὸ σύνολον οὐχ αἱ αὐταὶ
πᾶσιν.

τοῖς μὲν οὖν ὄρνισιν οἱ αὐχμοὶ συμφέρουσι καὶ
πρὸς τὴν ἄλλην ὑγίειαν καὶ πρὸς τοὺς τόκους, καὶ
οὐχ ἥκιστα ταῖς φάτταις, τοῖς δ' ἰχθύσιν ἔξω

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sters cast sometimes in spring and sometimes in autumn after producing young. Some crayfishes have been caught before now with the parts around the thorax soft because the shell has broken away, while the lower parts are hard because it has not yet broken away there; for their way of casting is not like that of the snakes.^a The crayfish hide for about five months. The crabs too cast the old-age: all agree that the soft-shelled ones do, and it is said that the hard-shelled do too, for example the maia. When they are casting, the shell becomes completely soft, and the crabs at least can hardly walk. Such animals cast not once but many times.

We have now spoken of all that hide, and when and how they do so, and also which kinds cast the old-age and when.

The seasons in which the animals thrive are not XVIII
the same, nor do they thrive equally in all the extremes of weather; furthermore healthy states and sicknesses vary with the seasons differently in animals of different kinds, and overall too are not the same for all.

Now the birds are benefited by dry weather, both for their general health and for having young, not least the wood pigeons, whereas the fishes, apart

^a 600b27.

¹ γίν. μαλ.] μαλακὰ γίνεται α Bk.

τινῶν ὀλίγων αἱ ἐπομβρίαι. ἀσύμφορα δὲ τοῦ-
 30 ναντίον ἑκατέροις, τοῖς μὲν ὄρνισιν τὰ ἐπομβρα
 ἔτη (οὐδὲ γὰρ ὅλως συμφέρει τὸ πολὺ πίνειν),
 τοῖς δ' ἰχθύσιν οἱ αὐχμοί. τὰ μὲν οὖν γαμφίω-
 601b νυχα, καθάπερ εἴρηται πρότερον, ὥς ἀπλῶς εἰπεῖν
 ἅποτα πάμπαν ἐστίν (ἀλλ' Ἡσίοδος ἠγνόει
 τοῦτο· πεποίηκε γὰρ τὸν τῆς μαντείας πρόεδρον
 αἰτὸν ἐν τῇ διηγήσει τῇ περὶ τὴν πολιορκίαν τὴν
 Νίνου πίνοντα)· τὰ δ' ἄλλα πίνει μὲν, οὐ πολὺ-
 5 ποτα δ' ἐστίν· ὁμοίως δ' οὐδ' ἄλλο οὐθὲν τῶν
 πνεύμονα ἐχόντων σομφὸν καὶ ὠτοόκων. τῶν δ'
 ὀρνίθων ἐν ταῖς ἀρρωστίαις ἐπίδηλος ἡ πτέρωσις
 γίνεται· ταράττεται γὰρ καὶ οὐ τὴν αὐτὴν ἔχει
 κατάστασιν ἥνπερ ὑγιαίνοντων.

XIX τῶν δ' ἰχθύων τὸ πλεῖστον γένος εὐθενεῖ¹
 10 μᾶλλον, ὥσπερ εἴρηται πρότερον, ἐν τοῖς ἐπομ-
 βρίοις ἔτεσιν· οὐ γὰρ μόνον τότε πλείω τροφὴν
 ἔχουσιν, ἀλλὰ καὶ ὅλως τὸ ὄμβριον συμφέρει,
 καθάπερ καὶ τοῖς ἐκ τῆς γῆς φυομένοις· καὶ γὰρ
 τὰ λάχανα καίπερ ἀρδευόμενα ὁμῶς ἐπιδίδωσιν
 ὑόμενα πλέον. τὸ δ' αὐτὸ καὶ οἱ κάλαμοι πάσχου-
 15 σιν οἱ πεφυκότες ἐν ταῖς λίμναις· οὐθὲν γὰρ ὥς
 εἰπεῖν αὐξάνονται μὴ γινομένων ὑδάτων. ση-
 μεῖον δὲ καὶ τὸ τοὺς πλείστους τῶν ἰχθύων εἰς

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from a certain few, are benefited by wet weather. And, on the contrary in each case, for the birds it is the rainy years that are unbeneficial (for it is altogether no benefit to them to drink much), while for the fishes it is the dry spells. Now the crook-taloned birds, as was said earlier,^a are generally speaking non-drinkers altogether (but Hesiod^b was ignorant of this: for in his poem the eagle that presides over the auguries, in his account of the siege of Ninos, is drinking). The other birds drink, but are not big drinkers; nor, similarly, is any other of those that have spongy^c lungs and are oviparous. When birds are in poor health their plumage shows it, for it is disturbed and does not have the same orderliness as when they are healthy.

Most of the fish kind thrive more in the rainy years, as was said before^d; for then they not only have more plentiful food, but in general rainy weather is beneficial as it is also to plants on land; for garden vegetables, even if watered, nevertheless improve more with rain. The same happens to the reeds that grow in the marshes: they make practically no growth unless rain falls. Evidence is the fact that most fishes migrate to the Pontus for the

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^a 593b29.

^b No such passage is extant. In place of Hesiod the β MSS have Herodotus, while Scotus has Homer. For the siege of Ninos (Nineveh) see Diod. Sic. II 26.

^c Cf. 594a8. ^d 601a29.

¹ β Dt.: $\epsilon\upsilon\sigma\theta\epsilon\nu\epsilon\iota$ α γ : $\epsilon\upsilon\theta\eta\nu\epsilon\iota$ Ald. Bk.

τὸν Πόντον ἐκτοπίζειν θεριοῦντας· διὰ γὰρ τὸ
 πλῆθος τῶν ποταμῶν γλυκύτερον τὸ ὕδωρ, καὶ
 τροφήν οἱ ποταμοὶ καταφέρουσι πολλήν. ἔτι δὲ
 20 καὶ εἰς τοὺς ποταμοὺς ἀναπλέουσι πολλοὶ τῶν
 ἰχθύων καὶ εὐθenoῦσιν¹ ἐν τοῖς ποταμοῖς καὶ ἐν
 ταῖς λίμναις, οἷον ἄμια καὶ κεστρεῦς. γίνονται
 δὲ καὶ οἱ κωβιοὶ πόντες ἐν τοῖς ποταμοῖς· καὶ
 ὅλως τὰ εὐλίμνα τῶν χωρίων ἀρίστους ἔχει ἰχθύς.
 αὐτῶν δὲ τῶν ὑδάτων οἱ θερινοὶ ὄμβροι συμ-
 25 φέρουσι μᾶλλον² τοῖς πλείστοις ἰχθύσι, καὶ ὅταν
 τὸ ἔαρ καὶ τὸ θέρος καὶ τὸ φθινόπωρον γένηται
 ἔπομβρον, ὁ δὲ χειμὼν εὐδεινός. ὥς δ' εἰπεῖν
 σύνολον,³ ὅταν καὶ κατὰ τοὺς ἀνθρώπους εὐ-
 ετηρία ᾖ, καὶ τοῖς πλείστοις ἰχθύσι συμβαίνει
 εὐημερεῖν.

ἐν δὲ τοῖς ψυχροῖς τόποις οὐκ εὐθenoῦσιν.⁴
 μάλιστα δὲ πονοῦσιν ἐν τοῖς χειμῶσιν οἱ ἔχοντες
 30 λίθον ἐν τῇ κεφαλῇ, οἷον χρομὶς λάβραξ σκίαϊνα
 φάγγρος· διὰ γὰρ τὸν λίθον ὑπὸ τοῦ ψύχους κατα-
 πήγνυται⁵ καὶ ἐκπίπτουσιν.

602a τοῖς μὲν οὖν πλείστοις ἰχθύσι συμφέρει μᾶλ-
 λον, κεστρεῖ δὲ καὶ κεφάλῳ καὶ ὃν καλοῦσί τινες
 μύρινον τοῦναντίον· ὑπὸ γὰρ τῶν ὀμβρίων ὑδά-

¹ A^{apr}. G^a Q β L^c Dt.: εὐθenoῦσιν C^a A^{rec}. F^a X^c E^a Ald.

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summer; for because of the number of rivers the water is sweeter, and the food brought down by the rivers is plentiful. Further, many of the fishes even swim up the rivers and thrive in the rivers and in the pools, for example bonito and grey mullet. The gobies too grow fat in the rivers; and in general fishes are best in the areas that have plenty of lagoons. As for the rain itself, summer showers are more beneficial to most fishes; they are benefited when spring, summer and autumn have turned rainy, but when the winter is fine. Generally speaking, when it is a good season in human terms, it turns out that most fishes too do well.

In cold places they do not thrive. And the ones that suffer most in winter are those with a stone^a in the head, for example chromis, basse, maigre, braize; for because of the stone they are frozen stiff and are cast ashore.

Now while most fishes tend to be benefited, the opposite happens to grey mullet and cephalus and to the fish that some call murinos. For most of them

^a The otolith, which is especially large in the *Sciaenidae*.

edd.: εὐσθενοῦσιν P K^c M^c m n

² μάλλον ante συ. transp. α Bk.

³ β γ (τὸ σύνολον L^c Ald.): ὅλως α Bk.

⁴ εὐθηνούσι α γ Ald. Bk.

⁵ πῆγνυται α: καταπῆγνυται Prec. L^c m Ald. edd.

- των οἱ πολλοὶ αὐτῶν ἀποτυφλοῦνται¹ θᾶπτον ἂν²
 ὑπερβάλλωσιν. εἰώθασι γὰρ πάσχειν αὐτὸ οἱ
 5 κέφαλοι ἐν τοῖς χειμῶσι μᾶλλον· γίνονται³ γὰρ
 αὐτῶν⁴ τὰ ὄμματα λευκά, καὶ ἀλίσκονται τότε
 λεπτοί, καὶ τέλος ἀπόλλυνται πάμπαν. ἔοικε δ'
 οὐ διὰ τὴν ὑπερομβρίαν τοῦτο πάσχειν μᾶλλον,
 ἀλλὰ καὶ⁵ διὰ τὸ ψῦχος μᾶλλον·⁶ ἥδη γοῦν καὶ
 ἄλλοθι καὶ περὶ Ναυπλίαν τὴν Ἀργείας περὶ τὸ
 τέναγος τυφλοὶ πολλοὶ⁷ ἐλήφθησαν ἰσχυροῦ
 10 γενομένου ψύχους· ἐλήφθησαν δὲ πολλοὶ καὶ
 λευκὴν ἔχοντες τὴν ὄψιν. πονεῖ δὲ τοῦ χειμῶνος
 καὶ ὁ χρύσοφρυς, τοῦ δὲ θέρους ὁ ἀχάρνας, καὶ
 γίνεται λεπτός. συμφέρεи δὲ τοῖς κορακίνοις ὥς
 εἰπεῖν παρὰ τοὺς ἄλλους ἰχθύς τὰ αὐχμῶδη μᾶλ-
 λον τῶν ἑτῶν· καὶ τούτοις δὲ διὰ τὸ συμβαίνειν
 15 ἀλέαν μᾶλλον ἐν τοῖς αὐχμοῖς.

τόποι δ' ἐκάστοις συμφέρουσι πρὸς εὐσθέ-
 νειαν,⁸ ὅσα μὲν εἰσι⁹ φύσει παράγεια ἢ πελά-
 για, ἐν ἑκατέρῳ τούτων, ὅσα δ' ἐπαμφοτερίζει, ἐν
 ἀμφοτέροις· εἰσὶ δὲ τινες καὶ ἴδιοι τόποι ἐκάστοις
 ἐν οἷς εὐθenoῦσιν.¹⁰ ὥς δ' ἀπλῶς εἰπεῖν οἱ φυκώ-

¹ ἀποτυφ. post ὑδάτων transp. a Bk.

² ἂν λίαν u Bk. ³ γίνεται A^a G^a Q Bk.

⁴ αὐτῶν post ὄμματα transp. a (exc. C^a) Bk.

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are quickly blinded by rain showers, if these are too heavy. It usually tends to happen particularly to the cephalus during winter storms: their eyes go white, and if caught then they are thin, and eventually they are destroyed completely. But it seems likely that this happens to them not particularly through the excess of rain but more particularly through the cold; there have at any rate been many cases, in various localities and especially in the shallows off Nauplia in the Argolid, of blind fishes caught after severe cold; many too have been caught with their eyes actually white. In winter the gilt-head suffers too, in summer the acharnas, and they grow thin. But the coracinus in contrast to almost all other fishes is benefited more by the dry years; moreover in its case it is because the dry spells tend to be accompanied by warmth.

Places help each kind to thrive: all that are by nature inshore or deep-sea fishes thrive in each of these areas respectively, while those that tend to both thrive in both. But there are also certain places peculiar to each kind, where they thrive. Generally speaking seaweedy places are beneficial:

⁵ om. α γ Cs. Bk.

⁶ om. α γ Cs. Bk.

⁷ πολ. τυφ. transp. α Bk.

⁸ cett.: εὐθένειαν L^c: εὐθενίαν Ald. Dt.: εὐθηνίαν Bk.

⁹ β γ Ald.: ἔτι C^a: ἔστι α Bk.

¹⁰ εὐσθενοῦσιν α P: εὐθηνούσιν γ Ald. Bk.

20 δεις συμφέρουσιν· πιότεροι γοῦν ἐν τοῖς τοιούτοις
 ἀλίσκονται ὅσοι παντοδαποὺς νέμονται τόπους· οἱ
 μὲν γὰρ φυκιοφάγοι τροφῆς εὐποροῦσιν, οἱ δὲ
 σαρκοφάγοι πλείουσιν ἐντυγχάνουσιν ἰχθύσιν.
 διαφέρουσι δὲ καὶ τὰ βόρεια καὶ τὰ νότια· τὰ γὰρ
 μακρὰ μᾶλλον εὐθενεῖ¹ ἐν τοῖς βορείοις, καὶ τοῦ
 θέρους ἀλίσκονται ἐπὶ τοῦ αὐτοῦ χωρίου πλείους
 25 τοῖς βορείοις τῶν μακρῶν καὶ τῶν πλατέων.

οἱ δὲ θύννοι καὶ οἱ ξιφίαι οἰστρῶσι περὶ κυνὸς
 ἐπιτολὴν· ἔχουσι γὰρ ἀμφότεροι τηνικαῦτα παρὰ
 τὰ πτερύγια οἷον σκωλήκιον τὸ καλούμενον οἰσ-
 τρον, ὅμοιον μὲν σκορπίῳ, μέγεθος δ' ἡλίκον
 ἀράχνης· ποιοῦσι δὲ ταῦτα πόνον τοιοῦτον ὥστ'
 30 ἐξάλλεσθαι οὐκ ἔλαττον ἐνίοτε τὸν ξιφίαν τοῦ
 δελφίνος, διὸ καὶ τοῖς πλοίοις πολλάκις ἐμ-
 πίπτουσιν. χαίρουσι δ' οἱ θύννοι μάλιστα τῶν
 ἰχθύων τῇ ἀλέᾳ, καὶ πρὸς τὴν ἄμμον τὴν πρὸς τῇ
 602b γῇ προσχωροῦσι τῆς ἀλέας ἕνεκεν, ὅτι θερμαίνον-
 ται καὶ ἄνω ἐπιπολάζουσιν.

τὰ δὲ μικρὰ τῶν ἰχθυδίων σώζεται διὰ τὸ
 παροραῖσθαι· διώκουσι γὰρ τὰ μείζω οἱ μεγάλοι.
 τῶν δ' ὥων καὶ τούτων² διαφθείρεται τὸ πολὺ διὰ

¹ εὐσθενεῖ C^a: εὐσθενῇ A^apr. G^a Q: εὐσθηνῇ A^arec.: εὐθηνεῖ γ
 (exc. L^crec.) F^a X^c Bk.

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at any rate, of those fishes that forage in every kind of place, those caught in weedy places are fatter. For the weed-eaters are well supplied with food, and the flesh-eaters encounter more fishes there. Northerly and southerly winds also make a difference: for the long fishes thrive more in the north winds, and in summer at the same spot there is a larger catch of long fishes during north winds than there is of flat fishes.

The tunny and swordfish suffer oistros-frenzy at about the rising of the dog-star,^a for at that season both have beside the fins a sort of little grub that is called a gadfly,^b resembling a scorpion but the size of a spider; these cause such distress that the swordfish leaps out of the water, sometimes as high as the dolphin, so that they often fall even on to ships. The tunny enjoy warmth most of all fishes, and go towards the sand by the shore for the warmth, because they get hot there and come to the surface above.

Among the small fry the little ones survive through being overlooked, for it is the bigger ones that the large fishes pursue. But the greater part of the eggs of the small ones too perish because of the

^a The morning rising in mid-July.

^b Oistros; cf. V 557a27 note, VII(VIII) 598a18, 599b26.

² τούτων β mrec. Ald.: τοῦ γόνου α Scot. Guil. Gaza Camot. Cs. Bk.

5 τὰς ἀλέας· οὗ γὰρ ἂν ἐφάψωνται, πᾶν τοῦτο
λυμαίνονται.

ἀλίσκονται δὲ μάλιστα οἱ ἰχθύες πρὸ ἡλίου ἀνα-
τολῆς καὶ μετὰ τὴν δύσιν, ὅλως δὲ περὶ δυσμὰς
ἡλίου καὶ ἀνατολὰς· οὗτοι γὰρ λέγονται εἶναι
ῥαῖοι βόλοι, διὸ καὶ τὰ δίκτυα ταύτην τὴν ῥαν
ἀναιροῦνται οἱ ἄλιεῖς. μάλιστα γὰρ ἀπατῶνται οἱ
10 ἰχθύες τῇ ὄψει κατὰ τούτους τοὺς καιρούς· τῆς
μὲν γὰρ νυκτὸς ἡσυχάζουσι, πλείονος δὲ γινομένου
τοῦ φωτὸς μᾶλλον ὀρώσιν.

νόσημα δὲ λοιμῶδες μὲν ἐν οὐδενὶ τοῖς ἰχθύσι¹
φαίνεται ἐμπίπτον οἷον ἐπὶ τῶν ἀνθρώπων συμ-
βαίνει πολλάκις καὶ τῶν ζωοτόκων καὶ τετραπό-
15 δων εἰς ἵππους καὶ βοῦς καὶ τῶν ἄλλων εἰς ἓνια
καὶ ἡμέρα καὶ ἄγρια· νοσεῖν μέντοι γε δοκοῦσιν·
τεκμαίρονται δ' οἱ ἄλιεῖς τῷ ἐνίους ἀλίσκεσθαι
λεπτοὺς καὶ ἡσθενηκόσιν ὁμοίους καὶ τὸ χρῶμα
μεταβεβληκότας ἐν πολλοῖς καὶ πίσις ἐαλωκό-
τας καὶ τῷ γένει τῷ αὐτῷ.

περὶ μὲν οὖν τῶν θαλαπτίων τοῦτον ἔχει τὸν
τρόπον.

XX τοῖς δὲ ποταμίοις καὶ λιμναίοις λοιμῶδες μὲν
21 οὐδὲ τούτοις οὐθὲν γίνεται, ἐνίοις δ' αὐτῶν ἴδια
νοσήματα ἐμπίπτει, οἷον γλάνις ὑπὸ κύνα

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hot spells, for these damage every part that they reach.

Catches of fishes are made mostly before sunrise and after sunset, and in general around the times of the sun's setting and rising. Casts made then are said to be timely, hence the fishermen haul up their nets at that time. For the fishes' eyesight deceives them most at these moments: they are quiet at night, and see better as the light grows.

No general plague-like sickness is observed to strike any of the fishes, such as often occurs in humans and attacks horses and cattle among the viviparous and quadruped, and certain others both tame and wild. Nevertheless they are thought to have illnesses: the fishermen infer this from the fact that some which are thin and look sickly and have changed colour are caught among many others of the same kind which are fat.

This then is the position regarding the sea fishes.

The river and lake fishes too suffer from no general plagues, but certain of them are attacked by diseases peculiar to themselves; for example glanis about the time of the dog-star especially, through

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¹ ἐν οὐδενὶ τοῖς ἰχθύσι β γ (τοῖς ἰχθύοις E^apr. K^c n, τῶν ἰχθύων Prec.) Ald.: οὐδὲν εἰς τοὺς ἰχθῦς α Cs. Bk.

μάλιστα διὰ τὸ μετέωρος νεῖν ἀστροβλής τε γίνε-
ται καὶ ὑπὸ βροντῆς νεανικῆς καροῦται. πάσχει
δέ ποτε τοῦτο καὶ κυπρίνος, ἦττον δέ. οἱ δὲ γλά-
25 νεις ἐν τοῖς βραχέσι καὶ ὑπὸ δράκοντος τοῦ ὄφεως
τυπτόμενοι ἀπόλλυνται.¹ ἐν δὲ τῷ βαλλίρῳ² καὶ
τίλῳ ἐλμῖς ἐγγινομένη ὑπὸ κύνα μετεωρίζει τε
καὶ ἀσθενῇ ποιεῖ· μετέωρος δὲ γινόμενος ὑπὸ τοῦ
καύματος ἀπόλλυται. τῇ δὲ χαλκίδι νόσημα ἐμ-
πίπτει νεανικόν· φθεῖρες ὑπὸ τὰ βράγχια γιγνό-
30 μενοι πολλοὶ ἀναιροῦσιν. τῶν δ' ἄλλων ἰχθύων
οὐθενὶ οὐθέν τοιοῦτόν ἐστι νόσημα.

ἀποθνήσκουσι δ' οἱ ἰχθύς τῷ πλόμῳ· διὸ καὶ
θηρεύουσιν οἱ μὲν ἄλλοι τοὺς ἐν τοῖς ποταμοῖς
603a καὶ λίμναις πλομίζοντες, οἱ δὲ Φοίνικες καὶ τοὺς
ἐν τῇ θαλάττῃ. ποιοῦνται δέ τινες καὶ δύο
ἄλλας θήρας τῶν ἰχθύων. διὰ γὰρ τὸ φεύγειν ἐν
τῷ χειμῶνι τὰ βαθέα ἐν τοῖς ποταμοῖς (καὶ γὰρ
ἄλλως τὸ πότιμον ὕδωρ ψυχρόν) ὀρύττουσι
5 τάφρον εἰς τὸν ποταμὸν διὰ ξηροῦ· εἶτα ταύτην
καταστεγάσαντες χόρτῳ καὶ λίθοις οἶον φωλεὸν³
ποιοῦσιν, ἔκδυσιν ἔχοντα ἐκ τοῦ ποταμοῦ· καὶ
ὅταν πάγος ᾗ ἐκ τούτου κύρτῳ θηρεύουσι τοὺς

¹ ἀπολ. πολλοί α Guil. Sn. Bk.

² βαλλέρω L^c m npr. Ald.: βαλέρω nrec. edd.: βαλλίρῳ Bk.

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swimming near the surface, becomes star-struck^a and also is stupefied by violent thunder. This happens also sometimes to carp, but to a lesser degree. The glanis is also destroyed in the shallows when struck by the dragon snake.^b In the balliros and tilon an intestinal worm, which develops in them at the time of the dog-star, makes them surface and weakens them; and having come to the surface they are destroyed by the heat. The chalkis is attacked by a violent disease: lice are produced under the gills in large numbers and destroy it. No such ailment occurs in any other fish.

Fishes are killed by mullein^c; hence people hunt them by poisoning them with mullein in the rivers and lakes, while the Phoenicians even poison those in the sea. Two other hunting methods are also used by some people against fishes. For because they avoid the deep water in rivers during the winter (for in any case the fresh water is cold) people dig a trench through the dry ground into the river; then they roof it over with grass and stones, making a sort of den that has an exit from the river into it; and when there is a frost they catch the

^a Cf. *Juv.* 470a32 and *Thphr. HP* IV 14. 7, both of plants. The star's own heat is meant, not merely the seasonal sun-scorch; cf. the moon's heat *PA* IV 680a34.

^b Dragon snake: not identified; mentioned as a land snake at *VIII(IX)* 609a4, 612a30.

^c *Verbascum sinuatum*, more usually spelled φλόμος.

³ β L^c Ald.: γωλεόν α Sn. Bk.: γρώλεον γ

ἰχθῦς. καὶ ἄλλην δὲ θήραν ποιοῦνται ὁμοίως
 θέρους καὶ χειμῶνος· ἐν μέσῳ τῷ ποταμῷ φρυγά-
 10 νοις καὶ λίθοις περιφράξαντες ὅσον στόμα κατα-
 λείπουσιν· ἐν τούτῳ κύρτον ἐνθέντες θηρεύουσιν
 περιελόντες τοὺς λίθους.

τῶν δ' ὀστρακοδέρμων καὶ τοῖς ἄλλοις συμ-
 φέρε¹ τὰ ἐπόμβρια² ἔτη πλὴν ταῖς πορφύραις.
 σημεῖον δέ· ὅταν γὰρ τεθῇ οὗ ποταμὸς ἐξερεύγε-
 ται, καὶ γεύσωνται τοῦ ὕδατος, ἀποθνήσκουσι
 15 αὐθημερόν. καὶ ζῇ δ' ἡ πορφύρα, ὅταν θηρευθῇ,
 περὶ ἡμέρας πεντήκοντα. τρέφονται δ' ὑπ' ἁλ-
 λήλων· ἐπιγίνεται γὰρ ἐπὶ τοῖς ὀστράκοις ὥσπερ
 φῦκός τι καὶ βρύον. ἃ δ' ἐμβάλλουσι εἰς τροφήν
 αὐταῖς, τοῦ σταθμοῦ χάριν εἶναι φασί³ πρὸς τὸ
 20 πλεόν ἔλκειν. τοῖς δ' ἄλλοις οἱ αὐχμοὶ ἀσύμφοροι·
 ἐλάττω γὰρ καὶ χείρῳ γίνεται, καὶ οἱ πυρροὶ τότε
 μᾶλλον γίνονται⁴ κτένες. ἐν δὲ τῷ Πυρραίων⁵
 ποτ' εὐρίπῳ ἐξέλιπον οἱ κτένες οὐ μόνον διὰ τὸ
 ὄργανον ᾧ θηρεύοντες ἀνέξουν ἀλλὰ καὶ διὰ τοὺς
 αὐχμούς.⁶ τοῖς δ'⁷ ἄλλοις ὀστρακοδέρμοις τὰ
 25 ἔπομβρα ἔτη συμφέρε⁸ διὰ τὸ γλυκερὰν⁸ γίνεσθαι
 τὴν θάλατταν. ἐν δὲ τῷ Πόντῳ διὰ τὸ ψῦχος οὐ
 γίνονται, οὐδ' ἐν τοῖς ποταμοῖς ἀλλ' ἢ ὀλίγα
 τῶν διθύρων· τὰ δὲ μονόθυρα μάλιστα ἐν τοῖς

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fishes out of it with a wicker weel. And another method is used in summer and winter alike: they make a dam with sticks and stones in the middle of the river, leaving just an opening in which they fix a weel, and so catch the fishes after taking away the stones from around the weel.

While the other testaceans are benefited by the rainy years, an exception is the purpura. Evidence of this: when placed where a river discharges, after tasting the water they die the same day. And after capture the purpura lives about fifty days. They are nourished by each other; for there develops on the shells a sort of sea-weed and oyster-green. The food that is thrown to them is said to be for the scales, to make the animals weigh more. But the others are not suited by dry spells; for they get smaller and worse, and scallops that are produced then tend to be the red ones. In the strait of Pyrrha the scallops once failed altogether, not only because of the instrument with which the fishermen dredged them up but also because of the droughts. The other testaceans are benefited by the rainy years because the sea becomes sweet. But they do not develop in the Pontus because of the cold, nor in the rivers save a few of the bivalves; the univalves tend mostly to be

¹ καὶ τοῖς ἄλλοις συμφέρει β γ Ald.: συμφ. τοῖς ἄλ. α Bk.

² ἔμομβρα α Bk. ³ φασὶ post σταθμοῦ transp. α Bk.

⁴ γίνονται μάλλον transp. α Bk.

⁵ β L^crec. Sn.: πυρραῖω α (πυραῖω A^a F^a) Sn.: πυρραῖον γ

⁶ ἀρχμούς καὶ α Bk. ⁷ δ' post ἄλλοις transp. α Bk.

⁸ γλυκυτέραν α Guil. Bk.

πάγοις ἐμπήγνυται.

περὶ μὲν οὖν τὰ ἔνυδρα τῶν ζώων τοῦτον ἔχει τὸν τρόπον.

XXI τῶν δὲ τετραπόδων αἱ μὲν ὕες νοσήμασι μὲν

31 κάμνουσι τρισίν, ὧν ἓν μὲν καλεῖται βράγχος, ἐν

ὧ μάλιστα τὰ περὶ σιαγόνας καὶ τὰ βράγχια¹

603b φλεγμαίνει. γίνεται δὲ καὶ ὅπου ἂν τύχη τοῦ

σώματος· πολλάκις γὰρ τοῦ ποδὸς λαμβάνεται,

ὅτε δ' ἐν τῷ ὥτί. γίνεται δ' εὐθύς σαπρὸν² καὶ

τὸ ἐχόμενον, ἕως ἂν ἔλθῃ πρὸς τὸν πλεύμονα·

τότε δ' ἀποθνήσκει. ταχὺ δ' αὐξάνεται· καὶ

5 οὐθὲν ἐσθίει ὅταν ἄρξηται τὸ πάθος καὶ ὅσονοῦν.

ἰῶνται δ' οἱ ὑοβοσκοί, ὅταν αἰσθωνται μένον σμι-

κρόν,³ ἄλλον μὲν οὐθέννα τρόπον, ἀποτέμνουσι δ'

ὅλον. δύο δ' ἄλλ' ἐστί, λέγεται δὲ κραυρᾶν

ἄμφω· ὧν τὸ μὲν ἕτερόν ἐστι κεφαλῆς πόνος καὶ

βάρος, ὧ αἱ πλείσται ἀλίσκονται· τὸ δ' ἕτερον, ἢ

10 κοιλία ῥεῖ. καὶ τοῦτο μὲν δοκεῖ εἶναι ἀνίατον,

θατέρω δὲ βοηθοῦσιν οἶνον προσφέροντες πρὸς

τοὺς μυκτῆρας καὶ κλύζοντες τοὺς μυκτῆρας

οἶνω. διαφυγεῖν δὲ καὶ τοῦτο χαλεπὸν· ἀναιρεῖ

¹ σιαγ. καὶ τὰ βρ.] τὰ βρ. καὶ τὰς σιαγ. a Bk.

² σαπ. εὐ. transp. a Bk.

³ μένον σμικρόν β L^{rec.}: μικρόν ὃν a L^{pr.} Guil. Ald. Bk.:
ὅταν μένον σμικρόν P: ὅταν μὲν ὃν σμικρόν E^a K^c n: ὅταν μὲν ον

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frozen in during the icy spells.

This then is the position regarding the aquatic animals.

Among the quadrupeds, the pigs suffer from three diseases, of which one is called *branchos*^a: in this chiefly the parts around the jaws and windpipe are inflamed. But it may develop also in any part of the body; for often it attacks the foot, and sometimes inside the ear. The adjacent part too becomes rotten immediately, until it reaches the lung, and then death follows. It advances quickly; and the animal eats nothing after the condition has begun, however slightly. The pig-keepers cure it, when they have detected it persisting while still of small extent, in only one way: they cut out the whole of it. And there are two other diseases, both called *krauros*.^b One of them is a pain and heaviness in the head, and is the one that most are caught by. The other is diarrhoea. The latter is held to be incurable, but the former is relieved by applying wine to the nostrils and washing the nostrils with wine. But this disease too is difficult to escape from; for it kills in three or four

XXI

^a Lit. "sore throat". Th. suggests that anthrax and foot-and-mouth are confused here.

^b Cf. 604a14, 19.

μικρόν (sic) M^c: incert. mpr.: ἀρξάμενον ἀποτέμνοντες mcorr.: *cum perceperint parvam existentem* Guil. (V): *cum inceperint p. e.* Guil. (F): *cum malum incipere senserint ... tota parte abscissa qua coeperit* Gaza

γὰρ ἐν ἡμέραις τρισὶν ἢ τέτταρσιν. βραγχῶσι δὲ
 μάλιστα ὅταν τὸ θέρος ἐνέγκῃ εὖ καὶ πιόταται
 15 ὦσιν· βοηθεῖ δὲ τὰ τε συκάμυνα διδόμενα καὶ τὸ
 λούτρον ἐὰν ἢ πολὺ καὶ θερμόν, καὶ ἐὰν τις
 σχάσῃ ὑπὸ τὴν γλῶτταν.

χαλαζῶδεις δ' εἰσὶ τῶν ὕων αἱ ὑγρόσαρκοι τὰ
 τε περὶ τὰ σκέλη καὶ τὰ περὶ τὸν τράχηλον καὶ
 τοὺς ὤμους, ἐν οἷς μέρεσι καὶ πλείσται γίνονται
 χάλασαι· καὶ μὲν ὀλίγας ἔχῃ, γλυκερά¹ ἢ σάρξ,
 20 ἂν δὲ πολλὰς, ὑγρὰ λίαν καὶ ἄχυλος² γίνεται.
 δῆλαι δ' εἰσὶν αἱ χαλαζῶσαι· ἐν τε γὰρ τῆς
 γλώττης³ τῷ κάτω ἔχουσι⁴ τὰς χαλάζας, καὶ ἐὰν
 τις τρίχα⁵ ἐκτίλῃ⁶ ἐκ τῆς λοφιᾶς ὕφαιμοι φαί-
 νονται· ἔτι δὲ τὰ χαλαζῶντα τοὺς ὀπισθίους
 πόδας οὐ δύνανται ἡσυχάζειν. οὐκ ἔχουσι δὲ
 25 χαλάζας ἕως ἂν ὦσι γαλαθῆναι μόνον. ἐκβάλ-
 λουσι δὲ τὰς χαλάζας ταῖς τιφαῖς· ὃ καὶ πρὸς
 τὴν τροφήν ἐστι χρήσιμον. ἄριστον δὲ πρὸς τὸ
 πιαίνειν καὶ τρέφειν οἱ ἐρέβινθοι καὶ τὰ σῦκα, τὸ
 δ' ὅλον μὴ ποιεῖν ἀπλὴν τὴν τροφήν ἀλλὰ ποικί-
 λην· χαίρει γὰρ μεταβάλλουσα καθάπερ καὶ
 30 τᾶλλα ζῶα, καὶ ἅμα φασὶ τὸ μὲν ἐμφυσᾶν τὸ δὲ
 σαρκοῦν τὸ δὲ πιαίνειν τῶν προσφερομένων, τὰς

¹ γλυκυτέρα a Guil. Bk.

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days. They get branchos mostly when the summer is fruitful and the pigs are fattest; it is relieved by feeding mulberries, by bathing in plenty of hot water, and by lancing under the tongue.

Pigs with watery flesh get pimples in the areas round the legs and neck and shoulders; in these parts pimples develop in the greatest numbers. If the pig has few pimples, the flesh is sweet, but if many, it becomes too watery and insipid. Those with pimple-sickness can be recognised, for not only do they get the pimples on the underside of the tongue, but also after a hair is plucked from the backbone they show blood; and further, those with pimple-sickness cannot keep their hind feet still. But they do not get pimples while they are only sucklings. The pimples are got rid of by feeding one-grained wheat, which is also useful for nutrition. The best thing for fattening and nourishing is chickpeas and figs, but in general one should not give a single diet but a varied one. For they enjoy changes just like the other animals; and at the same time it is said that, while one of the foods puts wind^a in, another makes flesh and another fattens, and

^a Internal wind assists nutrition, cf. 595b6-9.

² β γ Ald. Cs.: διάχυλος α Sn. Bk. Dt.: ἄχυμος m: *sucosa* Guil.: *insipida* Gaza

³ τῆς γλώττης τῷ A^arec. F^a X^c β γ Ald.: τῇ γλώττῃ τῇ C^a A^apr. G^a Q Bk.

⁴ ἔχουσι μάλιστα α Guil. Sn. Bk.

⁵ α β Guil.: τρέχας γ Ald. edd.

⁶ ἐκτίλλῃ S^c L^crec. Ald. edd.

604a δὲ βαλάνους μόνον¹ ἡδέως μὲν ἐσθίειν ποιεῖν δ' ὑγρὰν τὴν σάρκα· καὶ ἐὰν κύουσai πλείους ἐσθίωσιν, ἐκβάλλουσιν ὥσπερ καὶ τὰ πρόβατα· ταῦτα γὰρ ἐπιδηλοτέρως τοῦτο πάσχει διὰ τὰς βαλάνους. χαλαζῆ δὲ μόνον τῶν ζώων ὧν ἴσμεν ὕς.

XXII οἱ δὲ κύνες κάμνουσι νοσήμασι τρισίν· ὀνομά-
 5 ζεται δὲ ταῦτα λύττα, κυνάγχη, ποδάγρα. τούτων ἡ λύττα ἐμποιεῖ μανίαν, καὶ ὅταν² λυττώσιν ἅπαντα τὰ δηχθέντα πλὴν ἀνθρώπου ἀναιρεῖ.³ ἀναιρεῖ⁴ δὲ τὸ νόσημα τοῦτο τὰς⁵ κύνας.⁶ ἀναιρεῖ δὲ καὶ ἡ κυνάγχη τὰς κύνας· ὀλίγαι δὲ
 10 καὶ ἐκ τῆς ποδάγρας περισώζονται.⁷ λαμβάνει δ' ἡ λύττα καὶ τὰς καμήλους. τοὺς δ' ἐλέφαντας πρὸς μὲν τὰ ἄλλα ἀρρωστήματα ἀνόσους εἶναί φασιν, ἐνοχλεῖσθαι δ' ὑπὸ φουσῶν.

XXIII οἱ δὲ βόες οἱ ἀγελαῖοι νοσοῦσι δύο νόσους, ὧν
 τὸ μὲν ποδάγρα τὸ δὲ κραῦρος καλεῖται. ἐν μὲν
 15 οὖν τῇ ποδάγρα τοὺς πόδας οἰδοῦσιν, οὐκ ἀποθνήσκουσι δ' οὐδὲ τὰς ὀπλὰς ἀποβάλλουσι· βέλτιον δ' ἴσχουσι τῶν κεράτων ἀλειφομένων πίσση

¹ om. a Guil. Sn. Bk.

² ὅταν δάκη a γ (exc. L^{rec.}) Ald. Bk.

³ om. a (exc. G^arec. Q) γ (exc. L^{rec.}) Ald. Bk.

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that acorns alone, although eaten with pleasure, make the flesh watery; and if they eat too many while pregnant, they miscarry just as sheep do: for in sheep it is more obvious that this is due to the acorns. But pigs are the only one of the animals we know that have pimple-sickness.

Dogs suffer from three diseases; these are named rabies, dog-strangles, foot-ill. Of these, rabies produces madness, and when rabies develops in all animals that the dog has bitten, except man,^a it kills them; and this disease kills the dogs too. The strangles too destroys the dogs; and only few survive after the foot-ill. Rabies also attacks camels. But elephants are said to be immune to all ailments, but to be troubled by internal winds. XXII

Cattle in herds get two sicknesses, one called foot-ill and the other krauros. Now in foot-ill their feet swell, but they do not die nor do they cast the hooves; they obtain relief if the horns^b are smeared XXIII

^a The excepting of man is no doubt due to the medical belief that in man rabies is neither an inevitable result of the bite nor invariably fatal. See Celsus V 27.2 and Dioscurides 2.47.

^b Cf. 595b14.

⁴ ante ἀναιρει add. καὶ α γ (exc. L^crec.) Bk.

⁵ τὰς τε C^a A^apr. γ (exc. L^crec.) Ald. Bk.

⁶ post κύνας add. καὶ ἂν τι δηχθῇ ὑπὸ λυττώσης πλὴν ἀνθρώπου C^a A^apr. γ (exc. καὶ ὅτι ἂν δειχθῇ L^cpr. Ald.) Bk.

⁷ A^arec. β γ Ald.: περιφεύγουσιν C^a A^apr. G^a Q Bk.: διασώζονται F^a X^c

θερμῇ. ὅταν δὲ κραυρᾷ τὸ πνεῦμα γίνεται θερμὸν καὶ πυκνόν· καὶ ὃ ἐστὶν ἐν τοῖς ἀνθρώποις πυρετός, τοῦτό ἐστιν ἐν τοῖς βουσι τὸ κραυρᾶν.

20 σημεῖον δὲ τῆς ἀρρωστίας τὰ ὦτα καταβάλλουσι καὶ οὐ δύνανται ἐσθίειν. ἀποθνήσκουσι δὲ ταχέως, καὶ ἀνοιχθέντων ὁ πλεύμων φαίνεται σαπρός.

XXIV τῶν δ' ἵππων αἱ μὲν φορβάδες ἄνοσοι τῶν ἄλλων ἀρρωστημάτων εἰσὶ πλὴν ποδάγρας, ταύτην δὲ κάμνουσι, καὶ ἐνίοτε ἀποβάλλουσι τὰς
25 ὀπλᾶς· ὅταν δ' ἀποβάλλωσι¹ πάλιν φύουσιν εὐθύς· γίνεται γὰρ ἅμα τῆς ἐτέρας ὑποφυομένης ἢ τῆς ἐτέρας ὀπλῆς ἀποβολή. σημεῖον δὲ τῆς ἀρρωστίας· ὁ γὰρ ὄρχις ἄλλεται ὁ δεξιός, ἢ κατὰ μέσον ὀλίγον κάτωθεν τῶν μυκτήρων καὶ ἔγκοι-
λόν τι² γίνεται καὶ ῥυτιδῶδες.

οἱ δὲ τροφῖαι ἵπποι πλείστοις ἀρρωστήμασι
30 κάμνουσιν. λαμβάνει γὰρ καὶ εἰλεός· σημεῖον δὲ
604b τῆς ἀρρωστίας τὰ ὀπίσθια σκέλη ἐφέλκουσιν ἐπὶ
τὰ ἐμπρόσθια καὶ ὑποφέρουσιν ὥστε ἀλλήλους³
συγκρούειν. ἐὰν δ' ἀσιτήσας τὰς ἐμπροσθεν ἡμέ-
ρας εἴτα μανῇ, αἷμα ἀφαιροῦντες βοηθοῦσι καὶ
ἐκτέμνοντες. λαμβάνει δὲ καὶ τέτανος· σημεῖον

¹ ἀποβάλλωσι C^a E^a Bk.

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with hot pitch. When they have the krauros the breath becomes hot and rapid; and what in humans is fever, in cattle is krauros. Evidence of the ailment is a drooping of the ears and inability to eat. They die quickly, and when they are opened up the lung is seen to be rotten.

Among horses, those at pasture are free of all ailments except foot-ill, but they suffer from this and sometimes cast the hooves. But while casting them they are growing them again immediately: for the casting of the one hoof takes place simultaneously with the growing of the other hoof underneath. Evidence of the ailment: the right testicle twitches, or a place that is both hollow and wrinkled develops between and slightly below the nostrils.

XXIV

Stabled horses suffer from very many ailments. They are attacked by ileos^a: evidence of the ailment is that they draw up the hind legs to the forelegs and bring them so close that they collide with each other. If it first refuses food for some days and then goes mad, relief is given by blood-letting and by castration. Tetanus also attacks them: evidence of it is

^a A name in Hippocratic medicine for several internal disorders such as obstruction of intestines or kidneys; cf. Hipp. *int.* 44 (VII 274 L) and Littré's Index s.v. *iléus*. Th. suggests that here it refers to both colic and the staggers (coma somnolentum).

² καὶ ἔγκοιλον τι α (exc. om. F^a X^c) Trap. Gaza: ἐν κοίλον β L^{rec.} Guil. Ald.: om. Scot.: ἔγκοιλον Bk.

³ A^arec. F^a X^c β γ Ald.: ἀλλήλοις O^cpr. T^c: ὀλίγον C^a G^arec. Q Ott. Guil. Gaza Bk.: ὀλίγους A^apr. G^apr.

- 5 δ' αἱ φλέβες τέτανται πᾶσαι καὶ κεφαλὴ καὶ
 αὐχὴν, καὶ προβαίνει εὐθέσι τοῖς σκέλεσιν.
 γίνονται δὲ καὶ ἔμπυοι οἱ ἵπποι. λαμβάνει δὲ
 καὶ ἄλλος αὐτοὺς πόνος, καλεῖται δὲ τοῦτο κρι-
 θιᾶν· σημεῖον δὲ τοῦ ἀρρωστήματος μαλακὸς
 γίνεται ὁ οὐρανὸς καὶ θερμὸν πνεῖ. ἀνίατα δέ,
 10 ἔαν μὴ αὐτόματα καταστῇ.

- τό τε νυμφιᾶν καλούμενον, ἐν ᾧ συμβαίνει
 κατέχεσθαι ὅταν αὐλῇ τις καὶ κατωπιᾶν· καὶ
 ὅταν ἀναβῇ τις τροχάζει ἕως ἂν μέλλῃ κατὰ
 τινὰς θεῖν· κατηφεῖ δ' αἰεί, κἂν λυττήσῃ.
 σημεῖον δὲ καὶ τούτου τὰ ὦτα καταβάλλει πρὸς
 τὴν χαίτην καὶ πάλιν προτείνει, καὶ ἐκλείπει,
 15 καὶ πνεῖ.

- ἀνίατα δὲ καὶ τάδε, ἔαν καρδίαν ἀλγήσῃ (ση-
 μεῖον δὲ λαπάρας¹ ἀλγεί), καὶ ἔαν ἡ κύστις
 μεταστῇ (σημεῖον δὲ καὶ τούτου τὸ μὴ δύνασθαι
 οὐρεῖν, καὶ τὰς ὀπλὰς καὶ τὰ ἰσχία ἐφέλκει). καὶ
 ἔαν σταφύλινον περιχανή· τοῦτο δ' ἐστὶν ἡλίκον
 20 σφονδύλη. τὰ δὲ δῆγματα τῆς μυγαλῆς καὶ τοῖς
 ἄλλοις ὑποζυγίοις χαλεπά· γίνονται δὲ φλύκται-
 ναι. χαλεπώτερον δὲ τὸ δῆγμα ἔαν κύουσα
 δάκῃ· ἐκρήγνυνται γὰρ αἱ φλύκταιναι, εἰ δὲ μή,

¹ β (exc. O^c T^c) L^crec. : λαπαρὸς ὧν α γ (exc. P) Ald. Bk.

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tension in all the blood vessels and in the head and neck, and the horse walks forward straight-legged. Horses also develop abscesses. Another trouble that attacks them is called barley-surfeit; evidence of the ailment is softening of the palate and hot breath. These ailments are incurable unless they settle down of their own accord.

Also the so-called "nymphing",^a in which it comes about that when a flute is played the horse becomes spell-bound and stares at the ground; and when mounted it goes off fast until it is on the point of running people down; but it keeps its eyes down all the time, even if it is in a frenzy. A sign of this too is that it lays its ears back towards the mane and then pricks them again, and comes to a stop, and blows.

The following are also incurable: pain in the heart (a sign is pain in the flanks^b), and displacement of the bladder (a sign of this is the inability to urinate, and the horse draws up its hooves and haunches). Also if it gets a staphulinus in its mouth: this is the size of a sphondule. Shrew's bites are dangerous, as also to other beasts of burden: blisters develop. The bite is more dangerous if the shrew^c is pregnant when it bites; for then the blis-

^a Under a spell cast by the nymphs, *νυμφόληπτος*.

^b Or, according to the variant, "pain and loose bowels".

^c Or, according to Scot. and some *γ* MSS, "if it bites a pregnant mare".

οὐ. ἀποκτείνει δὲ δάκνουσα ἢ σφόδρα ποιεῖ ἀλ-
 γεῖν καὶ ἡ καλουμένη χαλκὶς ὑπὸ τινῶν, ὑπὸ δ'
 25 ἐνίων ζιγνίς· ἔστι δ' ὅμοιον ταῖς μικραῖς σαύ-
 ραῖς, τὸ δὲ χρῶμα τοῖς τυφλίνοις ὄφεσιν. ὅλως
 δέ φασιν οἱ ἔμπειροι σχεδὸν ὅσαπερ ἀρρωστεῖ ἄν-
 θρωπος ἀρρωστήματα καὶ ἵππον ἀρρωστεῖν καὶ
 πρόβατον. ὑπὸ φαρμάκου δὲ διαφθείρεται καὶ
 ἵππος καὶ πᾶν ὑποζύγιον σανδαράκης· δίδοται δ'
 30 ἐν ὕδατι καὶ διηθεῖται. καὶ ἐκβάλλει δὲ κύουσα
 ἵππος ὁσμὴν λύχνου ἀποσβεννυμένου· συμβαίνει
 605a δὲ τοῦτο καὶ γυναιξὶν ἐνίαις κυούσαις.

περὶ μὲν οὖν τὰς νόσους τῶν ἵππων τοῦτον
 ἔχει τὸν τρόπον.

τὸ δ' ἵππομανὲς καλούμενον ἐπιφύεται μὲν,
 ὥσπερ εἴρηται,¹ τοῖς πώλοις, αἱ δ' ἵπποι περι-
 λείχουσαι καὶ καθαίρουσαι ἀποτρώγουσιν αὐτό· τὰ
 5 δὲ ἐπιμυθεύόμενα πέπλασται μᾶλλον ὑπὸ γυναι-
 κῶν καὶ τῶν περὶ τὰς ἐπωδὰς. ὁμολογουμένως δὲ
 καὶ τὸ καλούμενον πῶλιον αἱ ἵπποι προεκβάλ-
 λουσι πρὸ τοῦ πώλου.

γινώσκουσι δ' οἱ ἵπποι καὶ τὴν φωνὴν ἀκούον-
 τες τῶν ἵππων οἷς ἂν μαχεσάμενοι τύχωσιν.
 10 χαίρουσι δ' οἱ ἵπποι τοῖς λειμῶσι καὶ τοῖς ἔλεσιν·

¹ β Guil.: λέγεται α γ Ald. Gaza edd.

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ters burst, while otherwise they do not. Death or intense pain is caused by the bite of the chalkis as some call it (others call it zignis): it resembles the small lizards, but in colour is like the blind-snakes. In general, the experts say, the horse and the sheep have about as many ailments as afflict man. A drug that is destructive both to horses and to all beasts of burden is sandarake^a; but it can be given in water and filtered. Also a pregnant mare miscarries at the smell of a lamp being extinguished; this happens to certain women too in pregnancy.

This then is the position regarding the diseases of horses.

The so-called hippomanes grows as we have said^b on foals, and the mares during their licking and cleaning bite it off; but the stories attached to it tend to be the inventions of women engaged in selling charms. What is undisputed is that the mares in fact eject the so-called polion^c before the foal.

Horses recognise even the voice of any horses that they happen to have fought against. Horses like meadows and marshes; for they drink water

^a Realgar, red sulphide of arsenic, which had several medicinal uses according to Dioscurides V 105; cf. Pliny XXXIV 55.177. The same word is reportedly used of bee-bread at VIII(IX) 626a7.

^b Cf. VI 577a8; see too 572a21 note. The variant ("as is said") would make it not a reference back but an independent report.

^c Presumably the waters, possibly intended at VI 572a20.

καὶ γὰρ τῶν ὑδάτων τὰ θολερὰ πίνουσι, καὶ ἢ
καθαρὰ ἀνατρέπουσιν αὐτὰ οἱ ἵπποι ταῖς ὀπλαῖς,
εἴτα πιοῦσαι λούονται. καὶ γὰρ ὅλως ἐστὶ φιλό-
λουτρον τὸ ζῶον καὶ ἔτι¹ φίλυδρον· διὸ καὶ ἡ τοῦ
ποταμίου ἵππου φύσις οὕτω συνέστηκεν. ὁ δὲ
βοῦς τοῦναντίον τοῦ ἵππου· ἂν γὰρ μὴ καθαρὸν
15 ἢ τὸ ὕδωρ καὶ ψυχρὸν καὶ ἀκέραιον, οὐκ ἐθέλει
πιεῖν.

XXV οἱ δ' ὄνοι νοσοῦσι μάλιστα νόσον μίαν, ἣν
καλοῦσι μηλῖδα. γίνεται δὲ περὶ τὴν κεφαλὴν
πρῶτον, καὶ ῥεῖ φλέγμα κατὰ τοὺς μυκτῆρας
παχὺ καὶ πυρρὸν· ἐὰν δὲ πρὸς τὴν πνεύμονα
καταβῇ, ἀποκτείνει· τὰ δὲ περὶ τὴν κεφαλὴν
20 πρῶτον οὐ θανάσιμα. δυσριγότατον δ' ἐστὶ τὸ
τοιοῦτον ζῶον·² διὸ καὶ περὶ τὸν Πόντον καὶ τὴν
Σκυθίαν³ οὐ γίνονται ὄνοι.

XXVI οἱ δ' ἐλέφαντες κάμνουσι τοῖς φυσώδεσι νοσή-
μασιν· διὸ οὔτε τὸ ὑγρὸν περίττωμα προίεσθαι
25 δύνανται οὔτε τὸ τῆς κοιλίας. καὶ ἐὰν γῆν ἐσθίῃ
μαλακίζεται, ἐὰν μὴ συνεχῶς· εἰ δὲ συνεχῶς,
οὐδὲν βλάπτεται. καταπίνει δὲ καὶ λίθους ἐνίοτε.
ἀλίσκεται δὲ καὶ διαρροία· ὅταν δ' ἀλῶσιν,
λατρεύουσιν ὕδωρ θερμὸν διδόντες πίνειν, καὶ τὸν

¹ om. a Bk.

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that is muddy, and if it is clean they turn it over with their hooves and then after drinking they bathe in it. For it is in general an animal that likes baths and also likes water; it follows that the hippopotamus too has a nature so constituted.^a But the ox is the opposite of the horse: for unless the water is clean and cold and unmixed it refuses to drink it.

Asses suffer mostly from one disease, called XXV
melis. It develops around the head first, and phlegm runs down the nostrils, thick and reddish. If the disease reaches the lung, it kills; but the developments around the head in the first instance are not fatal. This sort of animal is the least tolerant of cold; hence asses are not produced around the Pontus and Scythia.

Elephants suffer from the flatulent ailments, XXVI
through which they are unable to discharge either the fluid excrement or that of the belly. And if it eats earth it becomes weakly, unless it eats it continually: if it does so continually, it is not harmed. It also swallows stones sometimes. It is attacked by diarrhoea too; when attacked, they treat it by giving hot water to drink, and they dip the fodder in honey

^a Cf. 589a10 note. Horse and hippopotamus (river-horse) must have a watery constitutional blend, shown by their liking for bathing and for drinking water.

² G^a rec. Q β γ: τῶν τοιούτων ζώων α Guil. Bk.: τοῦτο τὸ ζῷον L^c Ald.: *talium animalium* Guil.: *hoc animal* Gaza

³ σκυθικὴν α Bk.

30 χόρτον εἰς μέλι βάπτοντες διδόασιν ἐσθίειν, καὶ
 ἴστησιν ἐκάτερον τούτων. ὅταν δὲ κοπιήσῃ¹ διὰ
 τὸ μὴ κοιμηθῆναι, ἀλλ' τριβόμενοι καὶ ἐλαίῳ καὶ
 605b ὕδατι θερμῷ τοὺς ὤμους ὑγιάζονται. καὶ ὅταν
 τοὺς ὤμους ἀλγῇ, ὕεια κρέα ὀπτήσαντες προστι-
 θέασι καὶ βοηθεῖ αὐτοῖς. ἔλαιον δ' οἱ μὲν πίνουσιν
 οἱ δ' οὐ τῶν ἐλεφάντων· κἂν τύχῃ σιδήριόν τι ἐν
 τῷ σώματι ἔνουν, τὸ ἔλαιον ἐκβάλλει ὅταν πίωνσιν,
 ὡς φασί· τοῖς δὲ μὴ πίνουσι τὸν οἶνον² ῥίζαν
 5 ἐψήσαντες ἐν ἐλαίῳ διδόασιν.

περὶ μὲν οὖν τῶν τετραπόδων ζώων τοῦτον
 ἔχει τὸν τρόπον.

XXVII τῶν δ' ἐντόμων τὰ πλείστα εὐθενεῖ³ ἐν ᾗ περ
 ὦρα καὶ γίνεται, ὅταν τοιοῦτον ᾗ τὸ ἔτος οἶον τὸ
 ἔαρ, ὑγρὸν καὶ ἀλεεινόν.

10 ταῖς δὲ μελίτταις ἐγγίνεται ἐν τοῖς σμήνεσι
 θηρία ἃ λυμαίνεται τὰ κηρία, τό τε σκωλήκιον τὸ
 ἀραχνιοῦν καὶ λυμαίνόμενον τὰ κηρία (καλεῖται

¹ κοπιήσῃ a Bk.

² μὴ πίνουσι τὸν οἶνον A^{apr}. G^a Q Ott.: μὴ πίνουσι A^{rec}. F^a
 X^c mrec. Sn. Bk.: πίνουσι τὸν οἶνον C^a: ὄνοις β γ Ald.: οὐ Bas.
 Ott. v.l.: et elephas bibit vinum. et quando non potest potare
 accipiunt medicinas et decoquunt cum oleo et dantes illud ei
 ad potandum Scot. Alb.: non bibentibus autem vinum radi-
 cem decoquentes in oleo dant Guil.: qui autem oleum non
 bibunt iis radix tyrtami decocta in vino datur Gaza

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when giving it to eat, and each of these settles the ailment. When it has become exhausted by not lying down to sleep,^a they are made sound by having their shoulders rubbed with salt and olive oil and hot water. And when the shoulders are painful they apply roasted pig-meat and this relieves them. Olive oil is drunk by some elephants but not by others; and if there happens to be some iron fragment in its body, a drink of olive oil expels it, so they say; to those that will not drink it they give, in the oil, the wine that they have made by boiling a root.

This then is the position regarding the quadruped animals.

Among insects, the majority thrive in the actual season in which they are produced, when the year is as it is in spring, wet and warm. XXVII

In the case of bees, small creatures are produced in the colonies which damage the honeycombs: one is the little grub that makes a web and is damaging to the honeycombs (it is called kleros,^b but some call

^a This looks like the story, denied at II 498a8 and IA 709a10, that the elephant cannot bend its legs but must sleep leaning against a tree (cf. Thomas Browne, *Pseudodoxia Epidemica* III 1).

^b Probably *Trichodes (Clerus) apiarius*, a beetle. Cf. VIII(IX) 626b17.

³ εὐθενεῖ β Dt.: ἡ C^a: εὐσθενῇ A^a G^a Q: εὐθηνεῖ F^a X^c γ Ald. Bk.

- δὲ κλῆρος, οἳ δὲ πυραύστην καλοῦσιν· ὃς ἐντίκτει
 ἐν τῷ κηρίῳ ὅμοιον ἑαυτῷ οἶον ἀράχνιον, καὶ
 νοσεῖν ποιεῖ τὸ σμήνος), καὶ ἄλλο θηρίον οἶον ὁ
 ἡπίολος ὁ περὶ τὸν λύχνον πετόμενος· οὗτος ἐν-
 15 τίκτει τι χνοῦ ἀνάπλεων, καὶ οὐ κεντεῖται ὑπὸ
 τῶν μελιττῶν ἀλλὰ μόνον φεύγει καπνιζόμενος.
 ἐγγίνονται δὲ καὶ κάμπαι ἐν τοῖς σμήνεσιν [ἃς
 καλοῦσι τερηδόνας]¹ ἃς οὐκ ἀμύνονται αἱ μέλιτ-
 ται. νοσοῦσι δὲ μάλιστα ὅταν ἐρυσιβώδη τὰ ἄνθη
 ἢ ὕλη ἐνέγκῃ, καὶ ἐν τοῖς αὐχμηροῖς ἔτεσιν.
 20 πάντα δὲ τὰ ἔντομα ἀποθνήσκει ἐλαιούμενα·
 τάχιστα δ' ἂν τις τὴν κεφαλὴν ἀλείψας ἐν τῷ
 ἡλίῳ θῇ.

- XXVIII ὅλως δὲ τὰ ζῶα διαφέρει κατὰ² τοὺς τόπους.
 ὥσπερ γὰρ ἐν τισιν ἔνια οὐ γίνονται³ παντάπασιν,
 οὕτως ἐν ἐνίοις τόποις γίνονται³ μὲν ἐλάττω
 25 δὲ καὶ ὀλιγοβιώτερα καὶ οὐκ εὐημερεῖ. καὶ ἐνίοτε
 ἐν τοῖς πάρεγγυς τόποις ἢ διαφορὰ γίνεται τῶν
 τοιούτων, οἶον τῆς Μιλησίας ἐν τόποις γειτνιῶ-

¹ ἃς καλοῦσι τερηδόνας edd.: om. a β Scot. Guil. Trap. Ott.:
 ἃς καλοῦσι lac. γ (nulla lac. E^a): ἃς καλ. περιδόνας Ald.: *vermi-*
culus qui teredo vocatur Alb.: *teredines dictae* Gaza

² ὅλως . . . κατὰ] διαφέρει δὲ τὰ ζῶα καὶ κατὰ a Guil. Bk.

³ γίνονται a Bk.

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it puraustes^a; it gives birth within the honeycomb to a sort of little spider resembling itself, and causes disease in the colony); another is a creature like the moth that flies round the lamp: this gives birth there to something full of down,^b and it is not stung by the bees but flies away only when smoked out. Caterpillars are also produced in the colonies [which they call teredo],^c against which the bees do not defend themselves. Bees become sick especially when the blossom on the trees is mildewed, and in years of drought.

All insects die if smeared with oil: and most quickly if one oils the head^d and exposes it to the sun.

In general the animals differ according to localities. For just as in some places certain animals do not occur at all, so in certain places they do occur but are smaller and shorter-lived and do not thrive. And sometimes the difference in such characteristics occurs in adjacent places, for example in neigh-

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^a The wax-moth *Galleria mellonella*, whose cocoon could be confused with the cobweb developed by *Clerus*.

^b Th.'s note ad loc. refers this to "the tubular galleries built by larvae of the moth out of grains of wax tied together with silken threads."

^c See app. crit. *Teredo* is first supplied by Alb. and then by Gaza, both probably following Pliny XI 21. 66. Elsewhere in Greek literature it means 'wood-borer'.

^d The insect's head or a head infested by insects? The latter is likely.

σιν ἀλλήλοις ἔνθα μὲν γίνονται τέττιγες ἔνθα δ'
 οὐ γίνονται, καὶ ἐν Κεφαλληνίᾳ ποταμὸς διείργει
 οὗ ἐπὶ τάδε μὲν γίνονται τέττιγες ἐπ' ἐκεῖνα δ'
 30 οὐ γίνονται. ἐν δὲ Πορδοσελήνῃ ὁδὸς διείργει ἥς
 ἐπ' ἐκεῖνα μὲν γαλὴ γίνεται, ἐπὶ θάτερα δ' οὐ
 γίνεται. καὶ ἐν τῇ Βοιωτίᾳ ἀσπάλακες περὶ μὲν
 606a τὸν Ὀρχομενὸν πολλοὶ γίνονται, ἐν δὲ τῇ Λε-
 βαδικῇ¹ γειτνιώσῃ οὐκ εἰσὶν, οὐδ' ἂν τις κομίσῃ
 ἐθέλουσιν ὀρύττειν. ἐν Ἰθάκῃ δ' οἱ δασύποδες,
 ἔάν τις ἀφῇ κομίσας, οὐ δύνανται ζῆν ἀλλὰ φαί-
 νονται τεθνεῶτες πρὸς τῇ θαλάττῃ ἐστραμμένοι
 5 ἥπερ ἂν εἰσαχθῶσιν. καὶ ἐν μὲν Σικελίᾳ οἱ ἵππεῖς
 μύρμηκες² οὐκ εἰσὶν, ἐν δὲ Κυρήνῃ οἱ φωνοῦντες
 βάτραχοι πρότερον οὐκ ἦσαν. ἐν δὲ Λιβύῃ
 πάσῃ οὔτε σὺς ἄγριός ἐστιν οὔτ' ἔλαφος οὔτ' αἰξ
 ἄγριος· ἐν δὲ τῇ Ἰνδικῇ, ὡς φησὶ Κτησίας οὐκ
 ὦν ἀξιόπιστος, οὔτ' ἡμερος οὔτε ἄγριος³ ὕς,

¹ λεβηδιακῇ C^a: λεβεσιακῇ A^apr. G^a Q: λεβαδιακῇ conl. Sn. Bk. Dt.

² σικελία οἱ ἵππεῖς μύρμηκες α: σικ. ἵππῆς μ. E^a K^c n: σικ. lac. μύρμηκες P: σικ. οἱ ἵππομύρμηκες M^c: σικ. ἵππομύρμηκες L^cpr. Ald. Bk.: σικ. ἵπποι μύρμηκες m: σικελίοις ἵπποις μύρμηκες β L^crec.: *equestres formice* Guil.: *formicae quae equites appellantur* Gaza

³ ἄγριος . . . ἡμερος transp. α Scot. Guil. Bk.: ἄγριος ὕς οὔτε ἡμερος S^c

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bouring regions of Milesia cicadas^a occur in one region and not in the other, and in Cephalenia there is a dividing river on one side of which cicadas occur while on the other side they do not. And in Por-doselene^b there is a dividing road on one side of which the weasel occurs but not on the other. And in Boeotia moles occur in large numbers around Orchomenos but are not in the neighbouring district of Lebadia, and if one takes them there they refuse to dig. In Ithaca hares cannot live if one takes them there and releases them, but are seen dead by the sea, turned in whichever direction they were brought from. And in Sicily the horseman-ants^c do not exist; in Cyrene the voiced frogs used not to exist. In all Libya there is neither wild pig nor deer nor wild goat.^d And in India, as Ctesias says (though he is not to be trusted), there is neither tame nor wild pig, while the blooded animals and

^a On the distribution of cicadas see also V 556a21.

^b An island near Lesbos.

^c Mentioned by Hesychius as a kind of ant but not further described. Cf. the horse- or horseman-crabs at V 525b7. Karsch and Dt. conjecture "winged ants", following Pliny XI 36. 110.

^d Herod. IV 192 says there is neither deer nor wild pig in Libya, but does not mention wild goat.

- 10 τὰ δ' ἔναιμα¹ καὶ τὰ φωλοῦντα πάντα μεγάλα.
καὶ ἐν μὲν τῷ Πόντῳ οὔτε τὰ μαλάκια γίνεται
οὔτε τὰ ὀστρακόδερμα, εἰ μὴ ἐν τισὶ τόποις ὀλί-
γοις² ἐν δὲ τῇ ἐρυθρᾷ θαλάττῃ ὑπερμεγέθη τὰ
ὀστρακόδερμα πάντα. ἐν δὲ Συρίᾳ τὰ πρόβατα
τὰς οὐράς ἔχει τὸ πλάτος πήχεος,³ τὰ δ' ὦτα αἱ
15 αἰγες σπιθαμῆς καὶ παλαιστῆς, καὶ ἔναι συμ-
βάλλουσι κάτω τὰ ὦτα πρὸς τὴν γῆν· καὶ οἱ
βόες ὥσπερ οἱ⁴ κάμηλοι κάλας⁵ ἔχουσιν ἐπὶ τῶν
ἀκρωτίων. καὶ ἐν Κιλικίᾳ⁶ αἱ αἰγες κείρονται
ὥσπερ τὰ πρόβατα παρὰ τοῖς ἄλλοις. καὶ ἐν μὲν
Λιβύῃ εὐθὺς γίνεται κέρατα ἔχοντα τὰ κερατώδη
τῶν κριῶν, οὐ μόνον οἱ ἄρρενες⁷ ὥσπερ Ὅμηρος
20 φησιν ἀλλὰ καὶ τὰ ἄλλα· ἐν δὲ τῷ Πόντῳ περὶ

¹ α (ἔναιμα A^a G^a Q): ἄναιμα β γ Ald. edd.: *sanguinem habentia* Scot. Guil.: *quae sanguine carent* Gaza

² β L^c rec. Scot. Guil. Ald.: ὀλίγα α γ Bk.

³ πήχεως C^a L^c Ald. edd.

⁴ αἱ α E^a L^c Ald. Bk.

⁵ κάλας sive καλὰς β γ: καμπὰς O^c rec. L^c pr. n Ald.: χαίτας α Cs. Bk.: *spatulas* Scot.: *jubas* Guil. Trap.: *nodos* Gaza

⁶ κιλικία β γ (κοελικία E^a) Gaza Ald.: λυκία α Cs. Bk.: *sicilia* Scot. Guil.

⁷ codd.: ἄρνες coni. Bk.

^a Ctesias *Indica* survives only in brief extracts in Photius' *Lexicon*, which describe (45b13ff) exceptionally big dogs, the fierce martichoras, sheep and goats bigger than

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those that hide are all large.^a And in the Pontus neither cephalopods nor testaceans occur, except in a few particular places, whereas in the Red Sea the testaceans are all enormous. In Syria the sheep have tails a cubit broad, and the goats have ears a span and a palm long and in some the ears meet below towards the ground; and the cattle, like camels, have humps on the shoulders. And in Cilicia the goats are shorn like the sheep in other places. And in Libya the horned rams have horns at birth—not only the males as Homer says but the others too.^b And in the Pontus near Scythia the

asses, a wild ass bigger than a horse, a huge worm, a little snake, some beetle-sized creatures, and also state that there is no tame or wild pig there. These extracts, so far as they go, support “blooded” rather than “bloodless”, but offer nothing towards “those that hide”; in place of the latter A.-W. conjectured “scaly” (φολιδωτὰ, which is often confused with φωλοῦντα, e.g. 599a9, 600b21), assuming Ctesias’ “huge worm” to be the crocodile.

^b *Od.* 4. 85: “Libya, where lambs are horned straight-away”. Bk. and subsequent edd. accordingly emended the MSS reading “males” (ἄρρενες) to “lambs” (ἄρνες); this leaves “the others” to be explained as “the other horned animals”, which may agree with Hdt. IV 29 speaking of animals in general; Hdt. then adds that cattle do not grow horns in extreme cold, from which Dt. proposes “cattle” (κτῆνηα) for “rams” earlier in this sentence. Sn. on the other hand proposed “rams” for “males”. These changes are unnecessary, for Homer speaks of the lambs as masculine so that Arist.’s point may be simply that not only Homer’s male lambs are horned but the females too. “The others” is actually rendered as “females” by both Scot. and Gaza, and the Greek MS m reads “females” (no doubt a scribal conjecture).

τὴν Σκυθικὴν τοῦναντίον· ἀκέρατα γὰρ γίνονται.
καὶ ἐν Αἰγύπτῳ τὰ μὲν ἄλλα μείζω ἢ ἐν τῇ Ἑλ-
λάδι, καθάπερ οἱ βόες καὶ τὰ πρόβατα, τὰ δ'
ἐλάττω, οἷον¹ λύκοι καὶ ὄνοι² καὶ λαγοὶ³ καὶ
ἀλώπεκες καὶ κόρακες καὶ ἱέρακες, τὰ τε⁴
25 παραπλήσια, οἷον κορῶναι καὶ αἰγες. αἰτιῶνται
δὲ τὰς τροφάς, ὅτι τοῖς μὲν ἀφθόνως⁵ τοῖς δὲ
σπανίως,⁶ οἷον τοῖς λύκοις καὶ τοῖς ἱέραξι· τοῖς
606b δὲ σαρκοφάγοις ἢ ὕλη,⁷ σπάνια γὰρ τὰ μικρὰ
ὄρνεα, τοῖς δὲ δασύποσι καὶ ὅσα οὐ⁸ σαρκοφάγα,
ὅτι οὐτ' ἀκρόδρυα οὐτ' ὀπώρα χρόνιος. πολλαχοῦ
δὲ καὶ ἡ κρᾶσις αἰτία, οἷον ἐν τῇ Ἰλλυρίδι καὶ τῇ
Θράκῃ καὶ τῇ Ἡπείρῳ οἱ ὄνοι μικροί, ἐν δὲ τῇ
5 Σκυθικῇ καὶ Κελτικῇ ὅλως οὐ γίνονται· δυσχεί-
μερα γὰρ ταῦτα. ἐν δ' τῇ⁹ Ἀραβίᾳ σαῦραι μεί-
ζους πηχυαίων· γίνονται δὲ¹⁰ καὶ μύες πολλοὶ¹¹
μείζους τῶν ἀρουραίων, τὰ μὲν πρόσθια¹² σκέλη
ἔχοντες καὶ σπιθαμῆς, τὰ δ' ὀπίσθια ὅσον ἄχρι

¹ οἷον οἱ α γ Bk.

² λύκοι καὶ ὄνοι β (λαγοὶ καὶ λύκοι καὶ ὄνοι transp. S^c): κύνες (sive κύνες) καὶ λύκοι α Sn. Bk.: ὄνοι καὶ λύκοι γ Ald.: canes et lupi Scot. Gaza: asini et lupi Guil.

³ λαγωὶ α L^c m n M^c Ald. Bk.

⁴ α β: δὲ γ Ald. edd.

opposite: they occur hornless. And in Egypt, whereas the other animals are larger than in Greece, such as the cattle and sheep, some are smaller, for example wolves and asses and hares and foxes and ravens and hawks, and some are about the same, for example crows and goats. The cause is said to be the food, in that it is unstinted for some but scanty for others such as the wolves and the hawks, and so is the provision for carnivores since the small birds are scanty, and for hares and all that do not eat flesh because neither nuts nor fruit have a long season. In many places the climate too is a cause, for example in Illyria and Thrace and Epirus the donkeys are small, while in Scythia and the Celtic country^a they do not occur at all; for these animals winter badly. In Arabia the lizards are over a cubit long, and there are many mice bigger than the field mice, having forelegs a span long and hind

^a Gaul.

⁵ β γ Ald.: ἀφθονος α Sn. Bk.

⁶ β γ Ald.: σπανία α Sn. Bk.

⁷ ἡ ὕλη β L^crec. Ald.: ὀλίγη α O^crec. γ Cs. Bk.: *cibus* Scot.
Gaza: *paucum* Guil.

⁸ μῆ α Bk.

⁹ om. α γ (exc. L^crec.) Bk.

¹⁰ om. α Bk.

¹¹ α β E^a npr.: πολὺ γ Guil. Gaza Ald. Bk.

¹² β L^crec. Ott.: ἐμπροσθεν α γ Ald. Bk.

τῆς πρώτης καμπῆς τῶν δακτύλων. ἐν δὲ τῇ
 Λιβύῃ τὸ τῶν ὄφρων γένος¹ γίνεται ἄπλατον,
 10 ὥσπερ καὶ λέγεται· ἤδη γὰρ τινές φασι² προσ-
 πλεύσαντες ἰδεῖν ὅσα βοῶν πολλῶν, καὶ δῆλον
 ἦν³ αὐτοῖς ὅτι ὑπὸ τῶν ὄφρων ἦν κατεδηδεσμένα·
 ἀναγομένων γὰρ ταχὺ διώκειν τὰς τριήρεις
 αὐτοῦς, καὶ ἐνίους αὐτῶν ἐμβάλλειν⁴ ἀνατρέψαντας
 τὴν τριήρη. ἔτι δὲ λέοντες μὲν ἐν τῇ Εὐρώπῃ
 15 μᾶλλον, καὶ τῆς Εὐρώπης ἐν τῷ μεταξὺ τόπῳ
 τοῦ Ἀχελώου καὶ Νέσσου μόνον·⁵ παρδάλεις δ'
 ἐν τῇ Ἀσίᾳ, ἐν δὲ τῇ Εὐρώπῃ οὐ γίνονται. ὅλως
 δὲ τὰ μὲν ἄγρια ἀγριώτερα ἐν τῇ Ἀσίᾳ, ἀνδρειό-
 τερα δὲ πάντα τὰ ἐν τῇ Εὐρώπῃ,⁶ πολυμορφότατα
 δὲ τὰ⁷ ἐν τῇ Λιβύῃ· καὶ λέγεται δὲ τις παροι-
 20 μία, ὅτι αἰεὶ φέρει τι ἢ Λιβύῃ⁸ καινόν. διὰ γὰρ τὴν
 ἀνομβρίαν μίσγεσθαι δοκεῖ ἀπαντῶντα πρὸς τὰ
 ὑδάτια καὶ τὰ μὴ ὁμόφυλα, καὶ ἐκφέρειν ὧν οἱ
 χρόνοι⁹ τῆς κυήσεως οἱ αὐτοὶ καὶ τὰ μεγέθη μὴ

¹ β L^crec. G^apr. Scot. Guil.: μέγεθος α γ Gaza Ald. Bk.

² φασί τινες α Bk.

³ καὶ δῆλον ἦν β γ Guil. Ald.: α δῆλον γενέσθαι α Gaza Bk.

⁴ ἐμβαλεῖν α Bk.: ἐκβάλλειν γ Ald.

⁵ β Guil.: om. α γ Ald. Bk.

⁶ ἀνδρ. δὲ ἐν τῇ εὐρ. πάντα α Guil. Bk.

⁷ om. α Bk.

⁸ λιβύη ante φέρει transp. α Bk. ⁹ χρό. οἱ α Bk.

HISTORIA ANIMALIUM VII(VIII)

legs as long as up to the first joint of the fingers.^a In Libya the snakes develop a monstrous size, so it is said; for some say there was a time when they sailed over there and saw the bones of many cattle which had clearly been devoured by the snakes; for as they were putting out to sea the snakes chased their galleys at speed, and threw some of their men into the water having overturned their galley. Further, whereas lions occur more in Europe (only in fact in that region of Europe that lies between the Achelous and Nessus), leopards on the other hand occur in Asia and not in Europe. In general the wild animals are wilder in Asia, but all those in Europe are braver, while those in Libya are the most varied in form: in fact there is a proverb that Libya ever bears something new.^b For it is thought that owing to the lack of rain animals meet at the water-holes and mate with each other even if not of the same breed,^c and bear to term if their periods of gestation are the same and if their sizes are not far off each other's;

^a Presumably the jerboa; cf. VI 581a4. Here the relative lengths of the legs have been reversed, and the simplest correction is to transpose "fore" and "hind". Sn. and Pk., following Guil., conjecture "fore-arm" in place of "fingers".

^b GA II 746b7 has the same proverb and explanation; cf. Pliny VIII 17. 42.

^c Fertile cross-breeds are discussed at GA II 746a31 (where there is an important error in the Loeb translation of ἀδιαφόροις: for "very different" read "without difference").

πολὺ ἀπ' ἀλλήλων· πρὸς ἄλληλα δὲ πραύνεται
 διὰ τὴν τοῦ ποτοῦ χρείαν. καὶ γὰρ καὶ δέονται
 25 τοῦ πίνειν τοῦναντίον τῶν ἄλλων τοῦ χειμῶνος
 μᾶλλον ἢ τοῦ θέρους· διὰ γὰρ τὸ μὴ εἰωθέναι
 ὕδατα γίνεσθαι τοῦ θέρους ἀσύνηθες αὐτοῖς τὸ
 πίνειν ἐστίν. καὶ οἳ γε μύες ὅταν πλώσιν ἀπο-
 607a θνήσκουσιν. γίνεται δὲ καὶ ἄλλα ἐκ μίξεως μὴ
 ὁμοφύλων, ὥσπερ καὶ ἐν Κυρήνῃ μίσγονται οἱ
 λύκοι¹ τοῖς² κυσὶ καὶ γεννώσι, καὶ ἐξ ἀλώπεκος
 καὶ κυνὸς οἱ Λακωνικοί. φασὶ δὲ καὶ ἐκ τοῦ
 τίγριος καὶ κυνὸς γίνεσθαι τοὺς Ἰνδικούς, οὐκ
 5 εὐθὺς δὲ ἀλλ' ἐκ³ τῆς τρίτης μίξεως· τὸ γὰρ
 πρῶτον γεννηθὲν θηριῶδες γίνεσθαι φασιν. ἄγον-
 τες δὲ δεσμεύουσιν εἰς τὰς ἐρημίας τὰς κύνας· καὶ
 πολλαὶ κατεσθίονται, ἐὰν μὴ τύχῃ ὀργῶν πρὸς
 τὴν ὀχείαν τὸ θηρίον.

XXIX ποιοῦσι δὲ καὶ⁴ οἱ τόποι διαφέροντα τὰ ἥθη,
 10 οἷον οἱ ὀρεινοὶ καὶ τραχεῖς τῶν ἐν τοῖς πεδίοις⁵
 καὶ μαλακοῖς· καὶ γὰρ τὰς ὄψεις ἀγριώτερα καὶ
 ἀλκιμώτερα, καθάπερ καὶ οἱ ἐν τῷ Ἀθῶ ὕες·
 τούτων γὰρ οὐδὲ τὰς θηλείας ὑπομένουσι τῶν

¹ οἱ λυκ. μι. α Bk.

² β E^a P K^c M^c: ταῖς α L^c m n Ald. Bk.

³ β Guil.: ἐπὶ α γ Bk.

they become mild towards each other because of their need for drink. For contrary to the other animals they even want to drink in winter more than in summer, for since there are usually no water supplies in the summer they are unaccustomed to drinking then. As for the mice,^a after drinking they die. Other animals too are produced from the mixing of different breeds, as in Cyrene the wolves mate with the dogs and generate young, and from fox and dog come the Laconian hounds.^b They say too that the Indian hounds come from tiger and dog, not immediately but after the third mating; for they say the first offspring is like a savage beast. They take the bitches to deserted places and tie them up; and many are devoured, if the wild animal does not happen to be excited for mating.

Localities also produce differences in character, for example mountainous and rough places produce characters different from those in level and soft places: even in their look they are wilder and fiercer, like the pigs on Mount Athos; for even their sows are

XXIX

^a Presumably jerboas like the Arabian "mice" at 606b6. Ordinary mice drink: 595a8.

^b Reported at VI 574a16 and VIII(IX) 608a27, but there is no mention there of cross-breeding and it must be a different hound.

⁴ καὶ post διαφέροντα transp. α Bk.

⁵ πεδινοῖς α Sn. Bk.

κάτω οἱ ἄρρενες.

- καὶ πρὸς τὰ δῆγματα δὲ τῶν θηρίων μεγάλην
 ἔχουσιν αἱ χῶραι διαφοράν, οἷον περὶ μὲν Φάρον
 15 καὶ ἄλλους τόπους οἱ σκορπιοὶ οὐ χαλεποί, ἐν
 ἄλλοις δὲ τόποις καὶ ἐν τῇ Σκυθίᾳ¹ πολλοὶ καὶ
 μεγάλοι καὶ χαλεποὶ γίνονται, καὶ ἐάν τινα
 πατάξωσιν ἄνθρωπον ἢ θηρίον ἀποκτείνουσι, καὶ
 τὰς ὕς, αἱ ἥκιστα αἰσθάνονται τῶν ἄλλων δηγμά-
 των, καὶ τούτων τὰς μελαίνας μᾶλλον ἀποκτείνου-
 20 σιν· μάλιστα² δ' ἀπόλλυνται αἱ ὕες πληγεῖσαι ἐὰν
 εἰς ὕδωρ ἔλθωσιν. τὰ τε τῶν ὄφεων δῆγματα
 πολὺ διαφέρουσιν. ἡ τε γὰρ ἄσπις ἐν Λιβύῃ γίνε-
 ται, ἐξ οὗ ὄφεως ποιοῦσι τὸ σηπτικόν, καὶ ἄλλως
 ἀνίατος.³ γίνεται δὲ καὶ ἐν τῷ σιλφίῳ τι ὀφίδιον,⁴
 οὗ καὶ λέγεται ἄκος εἶναι λίθος τις ὃν λαμβάνουσιν
 25 ἀπὸ τάφου βασιλέως τῶν ἀρχαίων καὶ ἐν οἴνῳ
 ἀποβάψαντες πίνουσιν. τῆς δ' Ἰταλίας ἐν τισὶ
 τόποις καὶ τὰ τῶν ἀσκαλαβωτῶν δῆγματα θανά-
 σιμά ἐστιν. πάντων δὲ χαλεπώτερα ἐστὶ τὰ
 δῆγματα τῶν λοβόλων ἐὰν τύχη ἀλλήλων ἐδηδο-
 κότα, οἷον σκορπίον ἔχῃς. ἐστὶ δὲ τοῖς πλείστοις

¹ σκυθία α β L^{rec}. Guil. Gaza A.-W. Dt. L.-V.: καρία γ
 Ald. Bk. Th. ² β γ Ald.: τάχιστα α Guil. Bk.

³ ἀνιάτως γ Ald. Bk.

⁴ G^a Q β L^{rec}. Ald.: ὀφείδιον α γ Bk.

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too much for the lowland boars to face.

Also with regard to the bite of wild animals the difference between regions is great, for example around Pharos and some other places the scorpions are not dangerous, whereas in other places, especially in Scythia, they are numerous, large and dangerous, and kill any man or beast that they strike, including pigs, which are least sensitive to other animal bites, and especially they kill the black pigs; after being struck the pigs are most likely to die if they go into water. Snake bites too differ greatly. For not only does the asp occur in Libya (the snake from which they make the putrefactive drug,^a and which is in any case deadly) but also there occurs in the silphium a certain little snake for which the remedy is said to be a particular stone which they take from the grave of one of the ancient kings and dip into wine, which they drink. In certain places in Italy the geckos' bites too are fatal. But more dangerous than any are the bites of the venomous animals after one happens to have eaten another, for example a viper that has eaten a scorpion. But to most of them^b human spittle is inimi-

^a Such drugs were used to treat cancerous and other growths, cf. Dioscur. II 61. 2, 62.

^b Louis suggests that "them" means not the animals but their bites, i.e. that human saliva is an antidote; this is supported by Pliny VII 2. 13. On the other hand Pliny VII 2. 15 also reports that human saliva is fatal to snakes, and Nicander *Ther.* 86 says that snakes are afraid of it.

- 30 αὐτῶν πολέμιον τὸ τοῦ ἀνθρώπου πτύελον. ἔστι
 δέ τι ὀφίδιον¹ μικρόν, ὃ καλοῦσί τινες ἱερόν, ὃ οἱ
 πάνυ μεγάλοι ὄφεις φεύγουσιν· γίνεται δὲ τὸ
 μέγιστον πηχυαῖον, καὶ δασὺ ἰδεῖν· ὃ τι δ' ἂν
 δάκη, εὐθὺς σήπεται τὸ κύκλω. ἔστι δὲ καὶ ἐν τῇ
 Ἰνδικῇ ὀφιδιόν² τι οὗ μόνου φάρμακον οὐκ ἔχουσιν.

607b

- XXX διαφέρει δὲ τὰ ζῶα τῷ εὐημερεῖν ἢ τοῦναντίον
 καὶ περὶ τὰς κηήσεις. τὰ μὲν γὰρ ὀστρακόδερμα,
 οἷον κτένες καὶ ἅπαντα τὰ ὀστρεώδη, καὶ τὰ
 μαλακόστρακα ἄριστα ἔστιν ὅταν κύη, οἷον τὰ
 караβώδη. βλέπεται³ δὲ ἡ⁴ κύησις καὶ τῶν
 5 ὀστρακοδέρμων· τὰ μὲν γὰρ μαλακόστρακα καὶ
 ὀχευόμενα ὁράται καὶ ἀποτίκτοντα, ἐκείνων δ'
 οὐθέν. καὶ τὰ μαλάκια δὲ κύοντα ἄριστα, οἷον τευ-
 θίδες τε καὶ σηπίαι καὶ πολύποδες. οἱ δ' ἰχθύες⁵
 ἀρχόμενοι μὲν κυίσκεσθαι σχεδὸν ἀγαθοὶ πάντες,
 προιούσης δὲ τῆς κηήσεως οἱ μὲν οἱ δ'
 10 οὔ. κύουσα μὲν οὖν ἀγαθὴ μαινίς· μορφή δὲ τῆς
 θηλείας στρογγυλωτέρα, ὃ δ' ἄρσην⁶ μακρότερος
 καὶ παχύτερος·⁷ συμβαίνει δ' ἀρχομένης κυίσκεσ-
 θαι τῆς θηλείας τοὺς ἄρρενας μέλαν τὸ χρῶμα
 ἴσχειν καὶ ποικιλώτερον, καὶ φαγεῖν χειρίστους

¹ F^a X^c β Ald.: ὀφειδιον α γ Bk.

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cal. There is a certain very small snake, which some call sacred, which the really big snakes avoid; it grows to a cubit at most, and is hairy in appearance; whatever it bites is at once putrefied all round. There is also a certain small snake in India which is the only one for which they have no remedy.

Animals differ as to good or bad health in relation to pregnancy. For the testaceans, for example scallops and all the oyster kind, and the crustaceans are at their best when pregnant, for example the crayfish kind. It is seen as pregnancy even in the testaceans, although while the crustaceans are seen mating and giving birth none of the testaceans is. And the cephalopods too are best when pregnant, for example teuthides and cuttlefishes and octopuses. The fishes are practically all good when beginning to become pregnant, but as the pregnancy advances some are good and some not. Now the mainis is good while pregnant; the female's shape is rounder, the male is longer and broader; but coincident with the beginning of the female's pregnancy the males acquire a dark and mottled colour and are worst for

XXX

² β Ald. $\delta\phi\epsilon\iota\delta\iota\omicron\nu$ α γ Bk.

³ $A^{a}rec.$ F^a X^c β γ Ald.: $\lambda\acute{\epsilon}\gamma\epsilon\tau\alpha\iota$ C^a $A^{a}pr.$ G^a Q Guil. Gaza Bk. ⁴ $om.$ α γ (exc. L^c $rec.$) Bk.

⁵ $\lambda\chi\theta\upsilon\varsigma$ γ Ald. Bk.

⁶ β γ Ald.: $\acute{\alpha}\rho\rho\eta\nu$ α Sn. Bk.

⁷ β γ Ald.: $\pi\lambda\alpha\tau\acute{\upsilon}\tau\epsilon\rho\omicron\varsigma$ α Cs. Bk.

- εἶναι· καλοῦνται δ' ὑπ' ἐνίων τράγοι περὶ τοῦτον
 15 τὸν χρόνον. μεταβάλλουσι δὲ καὶ οὓς καλοῦσι
 κοττύφους καὶ κίχλας καὶ ἡ καρὶς τὸ χρώμα
 κατὰ τὰς ὥρας, ὥσπερ ἔνια τῶν ὀρνέων· τοῦ
 μὲν γὰρ ἔαρος μέλανες γίνονται, εἴτα ἐκ τοῦ
 ἔαρος λευκοὶ πάλιν. μεταβάλλει δὲ καὶ ἡ φυκὶς
 τὴν χροάν· τὸν μὲν γὰρ ἄλλον χρόνον λευκὴ ἐστι
 20 τοῦ δ' ἔαρος ποικίλη· μόνη δ' αὕτη τῶν θαλατ-
 τίων ἰχθύων στιβάδας ποιεῖται,¹ ὥς φασί, καὶ
 τίκτει ἐν ταῖς στιβάσι.² μεταβάλλει δὲ καὶ ἡ
 μαινίς, ὥσπερ εἴρηται, καὶ ἡ σμαρίς, καὶ ἐκ λευ-
 κοτέρων πάλιν ἐν τῷ θέρει καθίστανται καὶ γί-
 νονται μέλανες· μάλιστα δ' ἐπίδηλός ἐστι περὶ
 τὰ πτερύγια καὶ τὰ βράγχια. καὶ κορακῖνος δ'
 25 ἄριστός ἐστι κύων, ὥσπερ καὶ ἡ μαινίς. κεστρεὺς
 δὲ καὶ λάβραξ καὶ οἱ λεπιδωτοὶ³ φαῦλοι κύοντες
 σχεδὸν πάντες. ὅμοιοι δὲ κύοντες καὶ μὴ ὀλίγοι,
 οἷον γλαῦκος. φαῦλοι δὲ καὶ οἱ γέροντες τῶν
 ἰχθύων, καὶ οἳ γε θύννοι καὶ εἰς ταριχείαν⁴ φαῦλοι
 οἱ γέροντες· πολὺ γὰρ συντήκεται τῆς σαρκός,
 30 τὸ δ' αὐτὸ καὶ ἐπὶ τῶν ἄλλων συμβαίνει ἰχθύων.
 δῆλοι δ' οἱ γέροντες αὐτῶν τῷ μεγέθει τῶν λε-
 πιδων καὶ τῇ σκληρότητι. ἤδη δ' ἐλήφθη γέρων
 θύννος οὗ σταθμὸς μὲν ἦν τάλαντα πεντεκαί-

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eating: they are called goats by some people around this time. There are also changes of colour according to the seasons in the fishes called blackbirds and thrushes and in the karis, as in some birds; for in spring they become dark, then as spring ends they become light again. The phykis too changes colour; for though light for the rest of the time, in spring it is variegated; this is the only sea fish that builds nests, so they say, and gives birth in the nests. The mainis too changes, as we said, and also the picarel, and from a lighter colour they change back in summer and become dark; the change is most conspicuous round the fins and gills. The coracinus too is best when pregnant, like the mainis. But grey mullet and basse and the scaly fishes are almost all in poor condition when pregnant. A few, such as glaucus, are the same whether pregnant or not. Old fishes too are poor, in fact the tunny when old are poor even for pickling; for much of the flesh wastes away. The same happens in the other fishes too. The old ones can be told by the size and hardness of the scales. An old tunny was once caught that

¹ στ. ποι. β γ Ald.: στιβαδοποιείται α Guil. Bk.

² β L^crec. Ald.: τῇ στιβάδι α γ Bk.

³ G^arec. Qrec. β γ Scot. Guil. Gaza Ald. Dt.: λοιποὶ πλωτοὶ α Sn. Bk.

⁴ β K^c M^c Gaza: ταρχείας α γ Guil. Bk. Dt.

δεκα, τοῦ δ' οὐραίου τὸ διάστημα πέντε¹ πήχεων
ἦν καὶ σπιθαμῆς.

608a οἱ δὲ ποτάμιοι καὶ οἱ λιμναῖοι ἄριστοι γίνονται
μετὰ τὴν ἄφεσιν τοῦ κυήματος καὶ τοῦ θοροῦ,
ὅταν ἀνατραφῶσιν· κυοῦντες² δ' ἔνιοι μὲν ἀγα-
θοί, οἷον σαπερδῖς, ἔνιοι δὲ φαῦλοι, οἷον γλανῖς.
οἱ μὲν οὖν ἄλλοι πάντες ἀμείνους οἱ ἄρρενες τῶν
5 θηλειῶν, γλανῖς δ' ὁ θῆλυς τοῦ ἄρρενος ἀμείνων.
καὶ ἐν ταῖς ἐγχέλυσι δὲ ἅς καλοῦσι θηλείας ἀμεί-
νους εἰσὶν· οὐκ οὔσας δὲ θηλείας καλοῦσιν, ἀλλὰ
τῇ ὄψει διαφόρους.

¹ β γ Bk.: δύο α Scot. Guil. Gaza

² F^a X^c β γ: κύοντες α E^a m Cs. Bk.

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weighed fifteen talents, and the span of its tail was five^a cubits and a hand-span.

The river and lake fishes reach their best when they have recovered after discharging the spawn and the milt. Some are good while pregnant, for example saperdis, while some are poor, for example glanis. Whereas all the other males are better than the females, in glanis the female is better than the male. And in the eels too those that they call females are better; but though called that, they are not females but are different in appearance.^b

^a Making a total width of a little over 2½ metres between the two points of the divided tail. The variant "two" (cf. Pliny IX 17. 44) would be a little over a metre.

^b At IV 538a13 Arist. says that the difference is one of kind (γένος).

Θ (I)

608a

- I Τὰ δ' ἦθη τῶν ζώων ἐστὶ τῶν μὲν ἀμαυροτέρων καὶ βραχυβιωτέρων ἥττον ἡμῖν ἐνδηλα κατὰ τὴν αἴσθησιν, τῶν δὲ μακροβιωτέρων ἐνδηλότερα. φαίνονται γὰρ ἔχοντά τινα δύναμιν περὶ ἕκαστον
- 15 τῶν τῆς ψυχῆς παθημάτων φυσικῇ, περὶ τε φρόνησιν καὶ εὐήθειαν καὶ ἀνδρείαν καὶ δειλίαν, περὶ τε πραότητα καὶ χαλεπότητα καὶ τὰς ἄλλας τὰς τοιαύτας ἕξεις. ἔνια δὲ κοινωνεῖ τινὸς ἅμα καὶ μαθήσεως καὶ διδασκαλίας, τὰ μὲν παρ' ἀλλήλων τὰ δὲ¹ παρὰ τῶν ἀνθρώπων, ὅσα περ
- 20 ἀκοῆς μετέχει, μὴ μόνον ὅσα τῶν ψόφων ἀλλ' καὶ ὅσα² τῶν σημείων αἰσθάνεται³ τὰς διαφοράς.

¹ δὲ καὶ α Sn. Bk.² καὶ ὅσα F^a X^c β P K^c: ὅσα καὶ α γ Cs. Bk.³ β Ald.: διαισθάνεται α γ Cs. Bk.^a See note a on page 56.^b The mental and psychological traits and the temperamental dispositions, also mentioned at I 488b12, VII(VIII) 588a18, VIII(IX) 610b20, 612b18, 629b5. For physiognomical characters see I 491b12 ff. The introduction to

BOOK VIII(IX)^a

The characters^b of the animals are less obvious to I
us by perception in the case of the less developed^c
and shorter-lived ones, but more obvious in the
longer-lived. For they are seen to have a certain
natural capability in relation to each of the soul's
affections—to intelligence and stupidity, courage
and cowardice, to mildness and ferocity, and the
other dispositions of this sort. Certain animals at
the same time are receptive of some learning and
instruction, some from each other, some from
humans, that is all that have some hearing (not just
those that hear sounds but also those that distin-
guish the differences between the signs).

VII(VIII) has prepared for this discussion.

^c Lit. "dim", not so much obscure to the external viewer
as intrinsically indefinite or less formed or feeble. *De*
Caelo 279a29: existence and life depend upon the heavens
but are more exact in some beings and less definite in oth-
ers (ἀκριβέστερον—ἀμαυρῶς, cf. *Met.* A 1075a16). *De Anima* I
403a21: "small and dim" feelings are contrasted with the
"strong and clear"; cf. *PA* III 667a19, *GA* IV 772b28.
Sophocles calls the blinded Oedipus ἀμαυρός (*OC* 182, 1018,
1639). So at 608b6 below, the clearer animals are those
whose character is more formed and nature more com-
plete, not necessarily those that are easier to observe.

ἐν πᾶσι δ' ὅσοις ἐστὶ γένεσι τὸ θῆλυ καὶ τὸ
 ἄρρεν, σχεδὸν ἢ φύσις ὁμοίως διέστησε τὸ ἦθος
 τῶν θηλειῶν πρὸς τὸ τῶν ἀρρένων. μάλιστα δὲ
 φανερόν ἐπὶ τε τῶν ἀνθρώπων καὶ τῶν μέγεθος
 25 ἐχόντων καὶ τῶν ζωοτόκων τετραπόδων. μαλα-
 κώτερον γὰρ τὸ ἦθος ἐστὶ¹ τῶν θηλειῶν, καὶ
 τιθασσεύεται θάπτον, καὶ προσίεται τὰς χεῖρας
 μᾶλλον, καὶ μαθηματικώτερον,² οἷον καὶ αἱ Λά-
 καιναι κύνες αἱ θήλειαι εὐφύεστεραι τῶν ἀρρέ-
 νων.³ τὸ δ' ἐν τῇ Μολοττίᾳ γένος τῶν κυνῶν τὸ
 μὲν θηρευτικὸν οὐδὲν διαφέρει πρὸς τὸ παρὰ τοῖς
 30 ἄλλοις, τὸ δ' ἀκόλουθον τοῖς προβάτοις τῷ μεγέ-
 θει καὶ τῇ ἀνδρείᾳ⁴ τῇ πρὸς τὰ θηρία. διαφέρουσι
 δ' οἱ ἐξ ἀμφοῖν ἀνδρείᾳ⁴ καὶ φιλοπονίᾳ, οἳ τε ἐκ
 τῶν ἐν τῇ Μολοττίᾳ γιγνομένων κυνῶν καὶ ἐκ
 τῶν Λακωνικῶν.

ἀθυμότερα δὲ τὰ θήλεα πάντα τῶν ἀρρένων
 πλὴν ἄρκτος καὶ πάρδαλις.⁵ τούτων δ' ἡ θήλεια
 35 δοκεῖ εἶναι ἀνδρειότερα. ἐν δὲ τοῖς ἄλλοις γένεσι
 608b τὰ θήλεα μαλακώτερα καὶ κακουργότερα καὶ
 ἥττον ἀπλᾶ καὶ προπετέστερα καὶ περὶ τὴν τῶν
 τέκνων τροφήν φροντιστικώτερα, τὰ δ' ἄρρενα

¹ ἐστὶ τὸ L^c m n Ald. Bk.

² μαθητικώτερον E^a Sylb. Bk.

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In all kinds in which there are the female and the male, nature has established much the same difference in the character of the females as compared with that of the males. But it is most evident in the case of humans and of the animals that have some size and of the viviparous quadrupeds. For the character of the females is softer, and quicker to be tamed, and more receptive of handling, and readier to learn, for example the female Laconian hounds are in fact cleverer than the males. The kind of hounds in Molossia^a is no different from those elsewhere in respect of hunting, but in shepherding it is superior by reason of size and of courage in facing wild animals. And those cross-bred from both, that is from the hounds produced in Molossia and from the Laconians, are superior in courage and love of work.

All females are less spirited than the males, except the bear and leopard: in these the female is held to be braver. But in the other kinds the females are softer, more vicious, less simple, more impetuous, more attentive to the feeding of the young, while the males on the contrary are more

^a From Epirus; one of the most famous breeds of guard-dog; see O. Keller, *Antike Tierwelt* I. 103.

³ ἀρρ. εἰσίν α Sylb. Bk.

⁴ ἀνδρία S^c γ Ald. Bk.

⁵ ἄρκτου κ. παρδάλεως α Bk.

- ἐναντίως θυμωδέστερα καὶ ἀγριώτερα καὶ ἀπλούστερα καὶ ἥττον ἐπίβουλα. τούτων δ' ἔχνη μὲν
 5 τῶν ἡθῶν ἐστὶν ἐν πᾶσιν ὥς εἰπεῖν, μᾶλλον δὲ φανερώτερα ἐν τοῖς ἔχουσι μᾶλλον ἥθος καὶ μάλιστα ἐν ἀνθρώπῳ· τοῦτο γὰρ ἔχει τὴν φύσιν ἀποτετελεσμένην, ὥστε καὶ ταύτας τὰς ἕξεις εἶναι φανερωτέρας ἐν αὐτοῖς. διόπερ γυνὴ ἀνδρὸς ἐλεημονέστερον καὶ ἀρίδακρυ μᾶλλον, ἔτι δὲ
 10 φθονερώτερον καὶ μεμψιμοιρότερον καὶ φιλολοιδόρον μᾶλλον καὶ πληκτικώτερον. ἔστι δὲ καὶ δύσθυμον μᾶλλον τὸ θῆλυ τοῦ ἄρρενος καὶ δύσελπι, καὶ ἀναιδέστερον καὶ ψευδέστερον, εὐαπατητότερον δὲ καὶ μνημονικώτερον, ἔτι δὲ ἀγρυπνότερον καὶ ὀκνηρότερον καὶ ὅλως ἀκινήτο-
 15 τερον τὸ θῆλυ τοῦ ἄρρενος, καὶ τροφῆς ἐλάττονός ἐστιν. βοηθητικώτερον δέ, ὥσπερ ἐλέχθη, καὶ ἀνδρειώτερον τὸ ἄρρεν τοῦ θήλεός ἐστιν, ἐπεὶ καὶ ἐν τοῖς μαλακίοις ὅταν τῷ τριόδοντι¹ πληγῇ ἡ σηπία ὁ μὲν ἄρρην βοηθεῖ τῇ θηλείᾳ, ἡ δὲ θήλεια

¹ τριόδοντι γ Ald. Bk.

^a See GA II 733b1 for Arist.'s theory that there are degrees of completeness or perfectedness in animals. It

spirited, wilder, simpler, less cunning. There are traces of these characters in virtually all animals, but they are all the more evident in those that are more possessed of character and especially in man. For man's nature is the most complete,^a so that these dispositions too are more evident in humans. Hence^b a wife is more compassionate than a husband and more given to tears, but also more jealous and complaining and more apt to scold and fight. The female is also more dispirited and despondent than the male, more shameless and lying, is readier to deceive and has a longer memory; furthermore she is more wakeful, more afraid of action, and in general is less inclined to move than the male, and takes less nourishment. The male on the other hand, as we have said,^c is a readier ally and is braver than the female, since even among the cephalopods when the cuttlefish has been struck by the trident the male comes to the female's help, whereas the female runs away when the male has

does not necessarily follow that he is judging them by the single standard of man, but that judged in their own context they are more or less successfully developed to meet the natural circumstances of their life.

^b The previous sentences have argued that characters are more evident because they are more precisely formed (cf. note at 608a11); hence in man the female possesses real differences of character that are quite finely distinguished from the male's.

^c To be assumed from 608b3 "more spirited".

φεύγει τοῦ ἄρρενος πληγέντος.

- πόλεμος μὲν οὖν πρὸς ἄλληλα τοῖς ζώοις
 20 ἔστιν ὅσα τοὺς αὐτοὺς τε κατέχει τόπους καὶ ἀπὸ
 τῶν αὐτῶν ποιεῖται τὴν ζωὴν. ἐὰν γὰρ ἦ σπά-
 νιος ἢ τροφή, καὶ πρὸς ἄλληλα τὰ ὁμόφυλα
 μάχεται, ἐπεὶ καὶ τὰς φώκας φασὶ πολεμεῖν τὰς
 περὶ τὸν αὐτὸν τόπον, καὶ ἄρρενι ἄρρενα καὶ
 θηλείᾳ θήλειαν, ἕως ἂν ἀποκτείνῃ ἢ ἐκβληθῇ
 25 θάτερον ὑπὸ θατέρου· καὶ τὰ σκυμνία ὡσαύτως
 πάντα. ἔτι δὲ τοῖς ὠμοφάγοις ἅπαντα πολεμεῖ,
 καὶ ταῦτα τοῖς ἄλλοις· ἀπὸ γὰρ τῶν ζώων ἢ
 τροφή αὐτοῖς· ὅθεν καὶ τὰς διεδρείας¹ καὶ τὰς
 συνεδρείας² οἱ μάντις λαμβάνουσι, διέδρα μὲν τὰ
 πολέμια τιθέντες, σύνεδρα δὲ τὰ εἰρηνεύοντα³
 30 πρὸς ἄλληλα. κινδυνεύει δέ, εἰ ἀφθονία τροφῆς
 εἴη, πρὸς τε τοὺς ἀνθρώπους ἀνέχειν⁴ τιθασσῶς
 τὰ νῦν φοβούμενα αὐτῶν καὶ ἀγριαίνοντα, καὶ
 πρὸς ἄλληλα τὸν αὐτὸν τρόπον. δῆλον δὲ ποιεῖ
 τοῦτο ἢ περὶ Αἴγυπτον ἐπιμέλεια τῶν ζώων· διὰ
 γὰρ τὸ τροφὴν ὑπάρχειν καὶ μὴ ἀπορεῖν μετ' ἀλ-
 35 λήλων ζῶσι καὶ αὐτὰ τὰ ἀγριώτατα· διὰ τὰς

¹ διέδρας α: διεδρίας γ Bk.

² συνεδρίας α L^c m Ald. Bk.: συνεδρείας κ. τὰς δι. transp. β

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been struck.

Now there is a war against each other among all animals that occupy the same places and get their living from the same things. For if their food is scarce, even those of the same breed fight against each other, for they say that even the seals living around the same place make war, male against male and female against female, until one kills the other or is driven away; and the pups all do the same. Further, all are at war with the carnivores, and they with the others; for they feed on the animals. It is from this that the diviners get their dissociations and associations,^a classing as dissociates those that are at war and as associates those that are at peace with each other. But if there were no shortage of food, those that are now frightened and grow wild would probably behave tamely both towards humans and in the same way towards each other. This is made clear by the way animals are looked after in Egypt; for because food is available and they are not in want, even the wildest animals live with each other; for they become tame because

^a Cf. Aesch. PV 492, Porphyry *de abstin.* 3. 3. Th. suggests that the following account (609a4–610a14) may owe much to a soothsayer's catalogue. That could well be a source of data about birds; but other animals are mentioned here too.

³ β L^c m n Ald.: εἰρηνοῦντα α (exc. εἰρηνοποιῶντα F^a X^c) γ Bk. ⁴ ἀν ἔχειν m edd.: *sustinendos* Guil.

609a ὠφελείας γὰρ ἡμεροῦται, οἷον ἐνιαχοῦ τὸ τῶν
 κροκοδείλων γένος πρὸς τὸν ἱερέα διὰ τὴν ἐπιμέ-
 λειαν¹ τῆς τροφῆς. τὸ δ' αὐτὸ τοῦτ' ἔστιν ἰδεῖν
 καὶ περὶ τὰς ἄλλας χώρας γινόμενον, καὶ κατὰ
 μόρια τούτων.

ἔστι δ' αἰετὸς καὶ δράκων πολέμια· τροφήν
 5 γὰρ ποιεῖται τοὺς ὄφεις ὁ αἰετός. καὶ ἰχνεύμων
 καὶ φάλαγξ· θηρεύει γὰρ τοὺς φάλαγγας ὁ
 ἰχνεύμων. τῶν δ' ὀρνίθων ποικιλίδες καὶ κορυ-
 δῶνες καὶ πίπρα καὶ χλωρεύς· τὰ γὰρ ὥα κατε-
 σθίουσιν ἀλλήλων. καὶ κορώνη καὶ γλαυξ· ἡ
 μὲν γὰρ τῆς μεσημβρίας, διὰ τὸ μὴ ὀξὺ βλέπειν
 10 τὴν γλαῦκα τῆς ἡμέρας, κατεσθίει ὑφανπάζουσα
 αὐτῆς τὰ ὥα, ἡ δὲ γλαυξ τῆς νυκτὸς τὰ τῆς κο-
 ρώνης, καὶ κρείττων ἡ μὲν τῆς ἡμέρας ἡ δὲ τῆς
 νυκτὸς ἔστιν. καὶ γλαυξ δὲ καὶ ὄρχιλος πολέμια·
 τὰ γὰρ ὥα κατεσθίει καὶ οὗτος τῆς γλαυκός.
 τῆς δὲ ἡμέρας καὶ τὰ ἄλλα ὀρνίθια τὴν γλαῦκα
 15 περιπέταται, ὃ καλεῖται θαυμάζειν, καὶ προσπε-
 τόμενα τίλλουσιν· διὸ οἱ ὀρνιθοθῆραι θηρεύουσιν
 αὐτῇ παντοδαπὰ ὀρνίθια. πολέμιος δὲ καὶ ὁ
 πρέσβυς καλούμενος καὶ γαλή καὶ κορώνη· τὰ

¹ ἐπιμελ. τὴν γ (exc. L^c) Bk.

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of the benefits given to them, for example in some places the crocodile kind has become tame towards the priest because their food is looked after. The same thing is to be seen occurring around the other countries too, and region by region within them.

At war are eagle and dragon-snake^a; for the eagle takes snakes for food. And ichneumon^b and venom-spider; for the ichneumon hunts the spiders. And among birds the poikilis, larks, pipra, chloreus; for they eat each other's eggs. And crow and owl; for at midday, because the owl does not see sharply by day, the crow steals and eats her eggs, while at night the owl steals the crow's, and the one gets the better by day and the other by night. Also owl and orchilos^c are at war, for the latter too eats the owl's eggs. By day the other small birds too fly round the owl (what is called 'admiring') and fly at her and pluck at her; hence the bird-catchers use^d the owl in hunting all sorts of small birds. At war too is the so-called 'old man' with weasel and crow, for they

^a Unidentified. Cf. VII(VIII) 602b25, VIII(IX) 612a30.

^b According to Th. with Pliny X 95. 204, XI 24. 72, not the Egyptian quadruped of 612a16 but the wasp of V 552b26; see Th.'s note here citing Fabre *Souv. Entom.* 1882, 206.

^c Th. *G.G.B.* s.v. identifies this with the wren trochilos, which is also called 'king' and 'old man'; cf. 609a17, 615a19; Aristoph. *Birds* 568. Louis ad loc. denies this identification.

^d Lit. "hunt by means of her", presumably as decoy: cf. 617b5. Contrast the use of hawks 620a34.

γὰρ ὧὰ καὶ τοὺς νεοττοὺς κατεσθίουσιν αὐτῆς.
 καὶ τρυγῶν καὶ πυραλὶς.¹ τόπος γὰρ τῆς νομῆς
 20 καὶ βίος ὁ αὐτός. καὶ κελεὸς καὶ λιβυός. ἰκτῖνος
 δὲ καὶ κόραξ· ὑφαιρεῖται γὰρ τοῦ κόρακος ὁ
 ἰκτῖνος ὅ τι ἂν ἔχη διὰ τὸ κρείττων εἶναι τοῖς
 ὄνουσι καὶ τῇ πτήσῃ, ὥστε ἡ τροφή ποιεῖ πολε-
 μίους καὶ τούτους. ἔτι οἱ ἀπὸ τῆς θαλάττης
 ζῶντες ἀλλήλοις, οἷον βρένθος καὶ λάρος καὶ ἄρπη.
 25 τριόρχης δὲ καὶ φρῦνος καὶ ὄφεις· κατεσθίει γὰρ ὁ
 τριόρχης αὐτούς. τρυγῶν δὲ καὶ χλωρεύς· ἀπο-
 κτείνει γὰρ τὴν τρυγόνα ὁ χλωρεύς, καὶ ἡ κορώνη
 τὸν καλούμενον τύπανον. τὸν δὲ κάλαριν ὁ αἰγώ-
 λιος² καὶ οἱ ἄλλοι γαμψώνυχες κατεσθίουσιν·
 ὅθεν ὁ πόλεμος αὐτοῖς. πόλεμος δὲ καὶ ἀσκαλαβώτης
 30 καὶ ἀράχνη· κατεσθίει γὰρ τοὺς ἀράχνας ὁ
 ἀσκαλαβώτης. ἵππῳ³ δὲ καὶ ἔρωδιῳ· τὰ γὰρ ὧὰ
 κατεσθίει καὶ τοὺς νεοττοὺς τοῦ ἔρωδιοῦ. αἰγίθῳ
 δὲ καὶ ὄνῳ πόλεμος διὰ τὸ παριόντα τὸν ὄνον
 ξύεσθαι⁴ εἰς τὰς ἀκάνθας τὰ ἔλκη· διὰ τε οὖν
 τοῦτο, κἂν ὀγκήσῃται, ἐκβάλλει τὰ ὧὰ καὶ τοὺς
 35 νεοττούς· φοβούμενοι γὰρ ἐκτίκτουσιν.⁵ ὁ δὲ διὰ
 τὴν βλάβην ταύτην κολάπτει ἐπιπετόμενος τὰ
 609b ἔλκη αὐτοῦ. λύκος δ' ὄνῳ καὶ ταύρῳ καὶ ἀλώπεκι
 πολέμιος· ὠμοφάγος γὰρ ὢν ἐπιτίθεται τοῖς βουσί

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eat her eggs and nestlings. And turtle-dove and pyralis, for they have the same feeding place and livelihood. And green woodpecker and libyus. And kite and raven, for because he is stronger both with his talons and in flight, the kite steals from the raven whatever he holds, so that their food makes enemies of these too. Further, those that live from the sea are at war with each other, for example brentus and gull and harpe. And buzzard and toad and snake, for the buzzard eats them. And turtle-dove and chloreus, for the chloreus kills the turtle-dove; and the crow kills the so-called tupanos. The kalaris is eaten by the aigolios and by the other crook-taloned birds, hence the war between them. And there is war between gecko and spider, for the gecko eats the spiders. And between horse and heron, for it eats the heron's eggs and nestlings. And between aigithos and ass there is war because the ass in passing rubs its sores on the thorns, and so by doing this, and if it brays, it throws out the eggs and the nestlings (for they are laid in fright); and the bird because of this injury flies at him and pecks his sores. The wolf is at war with ass, bull and fox, for being carnivorous it attacks the cattle

¹ β γ: πυραλλίς α Bk. ² αἰγωλιὸς C^a L^c Ald. Bk.

³ Ἰππῷ β γ Ald.: πιπὼν C^a ut vid.: πιπῶ α (exc. πιπρῶ F^a X^c): πίπω mcorr. edd.: *pipō* Guil. Gaza

⁴ cett.: κνήθεσθαι C^a Bk. Dt.

⁵ cett. Ald.: ἐκπίπτουσιν O^crec. mcorr. Guil. Gaza edd.

- καὶ τοῖς ὄνοις καὶ τῇ ἀλώπεκι. καὶ ἀλώπηξ
 δὲ καὶ κίρκος διὰ τὴν αὐτὴν αἰτίαν· γαμφώνυχος
 5 γὰρ ὢν καὶ ὠμοφάγος ἐπιτίθεται καὶ ἔλκη ποιεῖ
 κόπτων. καὶ κόραξ ταύρω καὶ ὄνῳ πολέμιος διὰ
 τὸ τύπτειν ἐπιπετόμενος αὐτοὺς καὶ τὰ ὄμματα
 κολάπτειν αὐτῶν. πολεμεῖ δὲ καὶ αἰετὸς καὶ
 ἔρωδιός· γαμφώνυχος γὰρ ὢν ὁ αἰετὸς ἐπιτίθεται,
 ὁ δ' ἀποθνήσκει ἀμυνόμενος. καὶ αἰσάλων δ'
 αἰγυπιῷ πολέμιος, καὶ κρῆξ ἐλεῷ καὶ κοττύφῳ
 10 καὶ χλωρίωνι, ὃν ἔνιοι μυθολογοῦσι γενέσθαι ἐκ
 πυρκαϊᾶς· καὶ γὰρ αὐτοὺς βλάπτει καὶ τὰ τέκνα
 αὐτῶν. καὶ σίττη καὶ τροχίλος αἰετῷ πολέμια·
 ἡ γὰρ σίττη καταγνύει τὰ ὠτὰ τοῦ αἰετοῦ, ὁ δ'
 αἰετὸς καὶ διὰ τοῦτο καὶ διὰ τὸ ὠμοφάγος εἶναι πολέ-
 15 μίος ἐστὶ πᾶσιν. ἄνθος δ' ἵππῳ πολέμιος· ἐξελαύν-
 νει γὰρ αὐτὸν¹ ὁ ἵππος ἐκ τῆς νομῆς· πόαν γὰρ
 νέμεται ὁ ἄνθος, ἐπάργεμος δ' ἐστὶ καὶ οὐκ ὀξύω-
 πός· μιμεῖται γὰρ τοῦ ἵππου τὴν φωνήν, καὶ φοβεῖ
 ἐπιπετόμενος· καὶ ἐξελαύνει, ὅταν δὲ λάβῃ κτείνει
 αὐτόν. οἰκεῖ δ' ὁ ἄνθος παρὰ ποταμὸν καὶ ἔλη,
 20 χροᾶν δ' ἔχει καλὴν καὶ εὐβίωτος. κωλωτῇ δ' ὄνος
 πολέμιος· κοιμᾶται γὰρ ἐν τῇ φάτνῃ αὐτοῦ, καὶ
 κωλύει ἐσθλὴν εἰς τοὺς μυκτῆρας ἐνδυνόμενος.

¹ β: om. α γ Ald. Bk.: ipsum Guil.

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and asses and the fox. And fox again and kirkos are at war for the same cause, for the kirkos being crook-taloned and carnivorous attacks it and produces sores by striking it. And the raven is at war with bull and ass, because it flies at them and strikes them and pecks their eyes. At war too are eagle and heron, for the eagle being crook-taloned attacks it and the heron dies defending itself. And merlin is at war with aegyptius, and krex with eleos and blackbird and oriole, which according to one legend was generated out of a funeral pyre; for the krex injures both them and their young. And sitte and trochilos are at war with the eagle; for the sitte breaks the eagle's eggs, and the eagle both because of this and because it is carnivorous is at war with all. Anthos is at war with the horse: the horse drives it out of the pasture, for the anthos forages in grass, and has white film on its eyes and does not see sharply: it mimics the horse's voice and scares him by flying at him; and he drives it away, but whenever he catches it he kills it. The anthos lives beside river and marshes; its colour is beautiful and it lives well.^a The ass is at war with the gecko, for it makes its bed in his manger and prevents him eating by creeping into his nostrils.

^a εὐβίος is applied to birds several times in HA VIII(IX). It is coupled with beauty, song, happiness, pleasing behaviour, and seems to denote more than an easy food-supply: it suggests that the bird lives successfully in its surroundings. The opposite is not δυσβίος (living in hardship) but κακόςβιος (living poorly, 616b31, 619a2).

τῶν δ' ἐρωδιῶν ἐστὶ τρία γένη, ὃ τε πέλλος καὶ ὁ
 λευκὸς καὶ ὁ ἀστερίας καλούμενος. τούτων ὁ πέλ-
 λος χαλεπῶς εὐνάζει¹ καὶ ὀχεύει· κράζει τε γὰρ
 καὶ αἶμα, ὥς φασίν, ἀφίησιν ἐκ τῶν ὀφθαλμῶν
 25 ὀχεύων, καὶ τίκτει φαύλως καὶ ὀδυνηρῶς. πολεμεῖ
 δὲ τοῖς βλάπτουσιν, ἀετῶ (ἄρπάζει γὰρ αὐτόν)
 καὶ ἀλώπεκι (φθείρει γὰρ αὐτὸν τῆς νυκτός) καὶ
 κορύδῳ (τὰ γὰρ ὠὰ αὐτοῦ κλέπτει). ὄφεις δὲ γαλῇ
 καὶ ὑὶ πολέμιον, τῇ μὲν γαλῇ κατ' οἰκίαν ὅταν
 30 ὦσιν ἀμφοτέρα· ἀπὸ γὰρ τῶν αὐτῶν ζῶσιν· ἡ δ'
 ὕς ἐσθίει τοὺς ὄφεις. καὶ αἰσάλων ἀλώπεκι πολέ-
 μιος· τύπτει γὰρ καὶ τίλλει αὐτήν, καὶ τὰ τέκνα
 ἀποκτείνει· γαμψώνυχος γάρ ἐστιν. κόραξ δὲ
 καὶ ἀλώπηξ ἀλλήλοις φίλοι· πολεμεῖ γὰρ τῷ
 αἰσάλωνι ὁ κόραξ· διὸ βοηθεῖ τυπτομένη αὐτῇ.
 35 καὶ αἰγυπιὸς δὲ καὶ αἰσάλων πολέμιος σφίσιν
 610a αὐτοῖς· ἀμφοτέροι γὰρ γαμψώνυχοι. μάχεται δὲ
 καὶ ἀετῶ αἰγυπιός. καὶ κύκνος καὶ ὁ ἀετός·² κρα-
 τεῖ δ' ὁ κύκνος πολλάκις· εἰσὶ δ' οἱ κύκνοι καὶ
 ἀλληλοφάγοι μάλιστα τῶν ὀρνέων.

ἔστι δὲ τῶν θηρίων τὰ μὲν αἰὲν πολέμια ἀλλή-
 λοις, τὰ δ' ὥσπερ ἄνθρωποι ὅταν τύχωσιν. ὄνος
 5 δὲ καὶ ἀκανθίδες πολέμιος· αἱ μὲν γὰρ ἐπὶ³ τῶν

¹ β: εὐνάζεται α E^a P K^c M^c Bk.: εὐνάζει τε L^c m n Ald.

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There are three kinds of herons, the grey, the white, and the so-called starry. Of these the grey has difficulty in being covered and in covering; for it screams and, so they say, drips blood from its eyes while covering, and it gives birth badly and painfully. It is at war with those that injure it, with eagle (which seizes it) and fox (which destroys it by night) and lark (which steals its eggs). The snake is at war with weasel and pig: with weasel when they are both in the house,^a for they are living off the same things; and the pig eats snakes. And merlin is at war with fox: it strikes and tears at it and kills the young, for it is crook-taloned. But raven and fox are friends to each other, for the raven is at war with the merlin, hence it comes to the fox's aid when it is being struck. The aegyptius and merlin, furthermore, are at war between themselves, for both are crook-taloned; and even the eagle is fought by the aegyptius. And swan and the eagle, and the swan often wins; and swans are also the most apt of all birds to eat each other.

Some wild animals are always at war with each other, but others only on occasion, like humans. The ass and akanthis are at war, for the akanthis

^a That is, a human habitation. On tame weasels and sacred household snakes see Keller I. 164, II. 284.

² καὶ ὁ αἰετός om. O^crec. S^c (ut vid.) L^c m n Gaza Ald. edd.

³ β² Ald.: ἀπὸ α γ Bk.: in Guil.

- ἀκανθῶν βιοτεύουσιν, ὁ δ' ἀπαλὰς οὔσας κατ-
 εσθίει τὰς ἀκάνθας. καὶ ἄνθος καὶ ἀκανθὶς καὶ αἰ-
 γίθος· λέγεται δ' ὅτι αἰγίθου καὶ ἄνθου αἷμα οὐ
 συμμίγνυται ἀλλήλοις. κορώνη δὲ καὶ ἐρωδιὸς
 φίλοι, καὶ σχοινίων καὶ κόρυδος, καὶ λαεδὸς καὶ
 10 κελεός· ὁ μὲν γὰρ κελεὸς παρὰ ποταμὸν οἰκεῖ
 καὶ λόχμας, ὁ δὲ λαεδὸς πέτρας καὶ ὄρη, καὶ
 φιλοχωρεῖ οὐκ ἂν οἰκῇ. καὶ πίφηξ¹ καὶ ἄρπη καὶ
 ἰκτῖνος φίλοι, καὶ ἀλώπηξ καὶ ὄφεις (ἄμφω γὰρ
 τραγλοδύται), καὶ κόττυφος καὶ τρυγῶν. πολέ-
 μιοι δὲ καὶ ὁ λέων καὶ ὁ θῶς ἀλλήλοις· ὠμοφάγοι
 γὰρ ὄντες ἀπὸ τῶν αὐτῶν ζῶσιν.
- 15 μάχονται δὲ καὶ ἐλέφαντες σφοδρῶς πρὸς
 ἀλλήλους, καὶ τύπτουσι τοῖς ὁδοῦσι σφᾶς αὐτούς·
 ὁ δὲ ἡττηθεὶς δουλοῦται ἰσχυρῶς, καὶ οὐχ ὑπομέ-
 νει τὴν τοῦ νικήσαντος φωνήν. διαφέρουσι δὲ καὶ
 τῇ ἀνδρείᾳ² ἀλλήλων οἱ ἐλέφαντες θαυμαστὸν
 ὅσον. χρῶνται δ' οἱ Ἰνδοὶ πολεμιστηρίοις, καθά-
 20 περ τοῖς ἄρρεσι, καὶ ταῖς θηλείαις· εἰσὶ μέντοι
 καὶ ἐλάττονες αἱ θήλειαι καὶ ἀψυχότεραι πολὺ.
 τοὺς δὲ τοίχους καταβάλλει ὁ ἐλέφας τοὺς ὁδόν-
 τας τοὺς μεγάλους προσβάλλων· τοὺς δὲ φοίνι-
 κας τῷ μετώπῳ ἕως ἂν κατακλίνῃ, ἔπειτα τοῖς
 ποσὶν ἐπιβαίνων κατατείνει ἐπὶ τῆς γῆς. ἔστι

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spends its life on the thorn-bushes, while the ass eats the thorns when they are tender. And anthos, akanthis, aigithos; it is said that the blood of aigithos and anthos does not mix. But crow and heron are friends, and schoinion and lark, and laedos and green woodpecker; for the woodpecker lives by river and thickets, the laedos by rocks and mountains, and they like the places they live in. And piphex and harpe and kite are friends, and fox and snake (for both live underground), and blackbird and turtle-dove. But the lion and the jackal are at war with each other, for being carnivorous they live off the same things.

Elephants too fight fiercely against each other and strike each other with their tusks. The defeated one is strictly enslaved and does not stand against the victor's voice. The elephants in fact differ to a remarkable degree in courage. As war elephants the Indians use the females too, just like the males; however, the females are smaller and much less spirited. The elephant knocks down walls by striking his large tusks against them; and he strikes at palm trees with his forehead until he has felled them, and then by trampling lays them flat on the

¹ β γ Ald.: *πίφιγξ* α Sn. Bk.

² *ἀνδρία* C^a γ (exc. n) Ald. Bk.

25 δὲ καὶ ἡ θήρα τῶν ἐλεφάντων τοιάδε· ἀναβάντες
 ἐπὶ τινὰς τῶν τιθασσῶν καὶ ἀνδρείων διώκουσι,
 καὶ ὅταν καταλάβωσι τύπτειν προστάττουσι τού-
 τοις ἕως ἂν ἐκλύσωσιν· τότε δ' ὁ ἐλεφαντιστὴς
 ἐπιπηδήσας κατευθύνει τῷ δρεπάνῳ. ταχέως δὲ
 μετὰ ταῦτα τιθασσεύεται τε καὶ πειθαρχεῖ. ἐπι-
 30 βεβηκότος μὲν οὖν τοῦ ἐλεφαντιστοῦ ἅπαντες
 πραεῖς εἰσίν, ὅταν δ' ἀποβῇ οἱ μὲν οἱ δ' οὐ·
 ἀλλὰ τῶν ἐξαγριουμένων τὰ ἐμπρόσθια σκέλη
 δεσμεύουσι σειραῖς ἵν' ἡσυχάζωσιν. ἔστι δ' ἡ
 θήρα καὶ μεγάλων ἤδη ὄντων καὶ πώλων.

αἱ μὲν οὖν φίλαι καὶ οἱ πόλεμοι τοῖς θηρίοις τού-
 τοις διὰ τὰς τροφὰς καὶ τὸν βίον συμβαίνουσιν.

II τῶν δ' ἰχθύων οἱ μὲν συναγελάζονται μετ'
 610b2 ἀλλήλων καὶ φίλοι εἰσίν, οἱ δὲ μὴ συναγελαζόμε-
 νοι πολέμιοι. ἀγελάζονται δ' οἱ μὲν κυοῦντες,
 ἔνιοι δ' ὅταν ἐκτέκωσιν. ὅλως δ' ἀγελαῖά ἐστι
 τὰ τοιάδε, θυννίδες, μαινίδες, κωβιοί,¹ βῶκες,
 5 σαῦροι, κορακῖνοι, συνόδοντες,² τρίγλαι, σφύραι-
 ναι, ἀνθῖαι, ἐλεγῖνοι, ἀθερίνοι, σαργῖνοι, βελόναι,

¹ om. α β Scot. Gaza

² συνώδοντες L^c m n Ald.: συνόδοντες edd.

^a Greek names are transliterated except where the identification with an English name is certain. On all

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ground. And the hunting of elephants is done as follows: they pursue them mounted on particular elephants that are tame and brave, and when they have overtaken one they order these tame ones to strike until they have exhausted it; then the elephant-driver leaps on to its back and directs it with the prong. After this it is quickly tamed and obeys orders. Now while the driver is mounted, they are all gentle; but after he has dismounted some are and some are not. But they bind the forelegs of those that turn wild with ropes to quiet them down. They hunt them both when they have grown big and as calves.

In these wild animals, then, their friendships and wars happen because of their feeding and way of life.

Among the fishes^a some form shoals with each other and are friends, while those that do not shoal are at war. Some form shoals while pregnant, and certain fishes do after giving birth. The following are shoaling fishes generally: tunnies, mainis, gobies, bogues, saurus, coracinus, synodon, red mullet, sphyraena, anthias, eleginus, atherines, sarginus, belone,^b squids, rainbow wrasse, pelamyds, II

these fishes see D. W. Thompson, *Glossary of Greek Fishes* 1947.

^b The γ MSS reading is uncertain; Gaza omits the word. At VI 567b22 belone is the pipe-fish, but here it is thought to denote the garfish, while at 616a32 its reference is uncertain.

- τευθοί, λουλίδες, πηλαμύδες, σκόμβροι, κολίαι.
 τούτων δ' ἔνια ἔστιν οὐ μόνον ἀγελαῖα ἀλλὰ καὶ
 σύζυγα· τὰ γὰρ λοιπὰ συνδυάζεται μὲν ἅπαντα,
 τὰς δ' ἀγέλας ποιοῦνται κατ' ἐπίους καιροῦς,
 10 ὥσπερ εἴρηται, ὅταν κύωσιν, ἔνια δὲ καὶ ὅταν
 τέκωσιν. λάβραξ δὲ καὶ κεστρεὺς πολεμιώτατοι
 ὄντες κατ' ἐπίους καιροῦς συναγελάζονται ἀλλή-
 λους· συναγελάζονται γὰρ πολλάκις οὐ μόνον τὰ
 ὁμόγονα ἀλλὰ καὶ οἷς ἡ αὐτὴ καὶ ἡ παραπλήσιός
 ἐστι νομὴ, ἂν ἢ ἀφθονος. ζῶσι δὲ πολλάκις
 15 ἀφηρημένοι οἱ κεστρεῖς τὴν κέρκον καὶ οἱ
 γόγγροι μέχρι τῆς ἐξόδου τῆς περιττώσεως·
 ἀπεσθίεται δ' ὁ μὲν κεστρεὺς ὑπὸ λάβρακος, ὁ δὲ
 γόγγρος ὑπὸ μυραίνης. ὁ δὲ πόλεμός ἐστι τοῖς
 κρείττοσι πρὸς τοὺς ἥττους· κατεσθίει γὰρ ὁ
 κρείττων. καὶ περὶ μὲν τῶν θαλαττίων ταῦτα.

- III τὰ δ' ἦθη τῶν ζώων, ὥσπερ εἴρηται πρότερον,
 21 διαφέρει κατὰ τε δειλίαν καὶ πραότητα καὶ ἀν-
 δρείαν καὶ ἡμερότητα καὶ νοῦν τε καὶ ἄγνοιαν.¹
 τό τε γὰρ τῶν προβάτων ἦθος, ὥσπερ λέγεται,

¹ codd. Ald.: *ignorantiam* Guil.: *dementia* Gaza: *ἀνοϊαν* coni. Sylb. edd.

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mackerel, coly-mackerel. Among these certain ones go not only in shoals but in pairs too: the others all pair off but only form shoals on certain occasions, as we said, that is some when pregnant and certain ones also after giving birth. Basse and grey mullet, although very hostile, shoal together on certain occasions; for often not only those of the same kinship shoal together but also those whose food supply is the same or similar, if it is plentiful. The grey mullet and congers often live after losing the tail as far as the vent for excrement. The grey mullet is eaten away at by the basse, the conger by the muraena. The war is made by the stronger against the lesser; for the stronger eat them. So much, then, on the sea animals.

The animals' characters, as we have said earlier,^a III
differ both in respect of cowardice, mildness, courage, tameness, and also in mind and ignorance.^b For the character of sheep and goats,^c so it

^b Sylburg's conjecture ἄνοιαν, 'stupidity', has been accepted by edd. Arist. presumably intends 'lack of nous'. This is the only place where he uses 'nous' of animals; elsewhere he says that they are φρόνιμος, μαθητικός, and possess διάνοια, σύνεσις. Obviously he does not intend nous in the technical sense of *de An.*, which is applicable only to humans, but the context suggests that he is distinguishing between animals that learn from experience or teaching and those that remain 'ignorant'. See notes at 588a20, 23.

^c Lit. "flocks"; see 627b5 note.

- εὐήθες καὶ ἀνόητον· πάντων γὰρ τῶν τετραπό-
 δων κάκιστόν ἐστι, καὶ ἔρπει εἰς τὰς ἐρημίας
 25 πρὸς οὐδέν, καὶ πολλάκις χειμῶνος ὄντος ἐξ-
 ἔρχεται ἔνδοθεν, καὶ ὅταν ὑπὸ τοῦ¹ νιφετοῦ ληφ-
 θῶσιν, ἂν μὴ κινήσῃ ὁ ποιμήν, οὐκ ἐθέλουσιν
 ἀπιέναι, ἀλλ' ἀπόλλυνται καταλειπόμενα ἔαν
 μὴ ἄρρενας κομίσωσιν οἱ ποιμένες· τότε δ' ἀκο-
 λουθοῦσιν. τῶν δ' αἰγῶν ὅταν τις μιᾶς λάβῃ τὸ
 30 ἄκρον τοῦ ἡρύγγου (ἔστι δ' οἶον θρίξ) αἱ ἄλλαι ἐσ-
 τᾶσιν ὥσπερ μεμωρωμένοι βλέπουσαι εἰς ἐκείνην.
 ἐγκαθεύδειν δὲ ψυχρότεραι ὄιες αἰγῶν· αἱ γὰρ
 αἰγες μᾶλλον μηρυκάζουσι² καὶ προσέρχονται
 πρὸς τοὺς ἀνθρώπους· εἰσὶ δ' αἱ αἰγες δυσριγώ-
 τεραι³ τῶν ὀίων. διδάσκουσι δ' οἱ ποιμένες τὰ
 35 πρόβατα συνθεῖν ὅταν ψοφήσῃ· ἔαν γὰρ βροντή-
 σαντος ὑποληφθῇ⁴ τις καὶ μὴ συνδράμῃ, ἐκτι-
 611a τρώσκει ἔαν τύχῃ κύουσα· διὸ ἔαν ψοφήσῃ⁵ ἐν τῇ
 οἰκίᾳ συνθέουσι διὰ τὸ ἔθος. ἀπόλλυνται δὲ καὶ
 οἱ ταῦροι ὅταν ἀτιμαγελήσαντες ἀποπλανηθῶσιν,
 ὑπὸ θηρίων. κατάκεινται δ' αἱ ὄιες καὶ αἱ αἰγες
 5 ἄθροαι κατὰ συγγένειαν· ὅταν δ' ὁ ἥλιος τραπῇ
 θᾶττον, φασὶν οἱ ποιμένες οὐκέτι ἀντιβλεπούσας
 κατακεῖσθαι τὰς αἰγας ἀλλ' ἀπεστραμμένας ἀπ'
 ἀλλήλων.

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is said, is simple-minded and stupid: of all the quadrupeds it is the worst, and it wanders into deserted places towards nothing, and often in wintry weather it goes out from indoors, and when they are caught by the snow they are unwilling to go away unless the shepherd moves them, but are left behind and perish unless the shepherds bring males, and then they follow. And when one grasps the tip of one she-goat's beard (which is like hair) the others stand as if stupefied looking at her. Sheep are colder than goats to sleep among; for the goats chew the cud more and come towards people. But the goats are less tolerant of cold than the sheep. The shepherds teach the flocks to run together after a sudden noise; for if one is caught in a thunder-storm and does not run with the others, it miscarries if it happens to be pregnant. This is why, if there is a sudden noise in the house, they run together out of habit. The bulls too are destroyed, when they have left the herd and wandered off, by wild animals. The sheep and the goats lie in family groups. And when the sun turns more quickly,^a the shepherds say that the goats lie no longer facing each other but turned away.

^a This strange expression, if correct, must mean that sunset is earlier, i.e. after the summer solstice.

¹ om. α Bk.

² β: ἡσυχάζουσι α O^crec. γ Scot. Guil. Gaza Bk.

³ α β: -ότεραι γ Ald. Bk.

⁴ ὑπολειφθῇ E^a M^c L^c m n Ald. Bk. Dt. ⁵ ψοφῇ α γ Bk.

IV αἱ δὲ βόες καὶ νέμονται καθ' ἑταιρείας καὶ συνηθείας, κἂν μία ἀποπλανηθῇ ἀκολουθοῦσιν αἱ ἄλλαι· διὸ καὶ οἱ βουκόλοι, ἔαν μίαν μὴ εὕρωσιν, εὐθὺς πάσας ἐπιζητοῦσιν.

10 τῶν δ' ἵππων αἱ σύννομοι, ὅταν ἡ ἑτέρα ἀποληται, ἐκτρέφουσι τὰ πωλία ἀπ'¹ ἀλλήλων. καὶ ὅλως γε δοκεῖ τὸ τῶν ἵππων γένος εἶναι φύσει φιλόστοργον. σημεῖον δέ· πολλάκις γὰρ αἱ στέριφαι ἀφαιρούμεναι τὰς μητέρας τὰ πωλία αὐταὶ² στέργουσι, διὰ δὲ τὸ μὴ ἔχειν γάλα διαφθείρουσιν.

V τῶν δ' ἀγρίων καὶ τεραπόδων ἡ ἔλαφος οὐχ
16 ἥκιστα δοκεῖ εἶναι φρόνιμος, τῷ τε τίκτειν παρὰ τὰς ὁδοὺς (τὰ γὰρ θηρία διὰ τοὺς ἀνθρώπους οὐ προσέρχεται) καὶ ὅταν τέκη ἐσθίει τὸ χόριον πρῶτον. καὶ ἐπὶ τὴν σέσελιν δὲ τρέχουσι, καὶ φαγοῦσαι οὕτως ἔρχονται πρὸς τὰ τέκνα πάλιν.
20 ἔτι δὲ τὰ τέκνα ἄγει ἐπὶ τοὺς σταθμούς, ἐθίζουσα οὐ δεῖ ποιεῖσθαι τὰς ἀποφυγὰς· ἔστι δὲ τοῦτο πέτρα ἀπορρώξ, μίαν ἔχουσα εἴσοδον, οὗ δὴ καὶ ἀμύνεσθαι ἤδη φασὶν ὑπομένουσαν. ἔτι δὲ ὁ ἄρ-
ρην ὅταν γένηται παχύς (γίνεται δὲ σφόδρα πῖων

¹ om. α γ Ald. Bk.

² codd. Ald.: *ipsae* Guil. Gaza: *αὐταὶ* edd.

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The cattle too graze with their companions in IV
habitual groups, and if one strays the others follow;
hence if the cowherds fail to find a particular one,
they immediately look for them all as well.

Among the horses, when one mare has died the
mares that graze together rear each other's foals.
And in general the horse kind seems to have by
nature a parental affection. Evidence of this is that
often the barren mares steal the dams' foals, and are
the ones that care for them, but through having no
milk cause their death.

Among animals that are wild and quadruped the V
deer is held to be an intelligent one, not least
because it both gives birth alongside the roads^a (for
the wild beasts do not approach because of the
humans) and, after giving birth, first eats the mem-
brane. Also they run for the seseli^b and eat it before
going back to their young. Further, she leads the
young to her lair, accustoming them to the place
where they should seek refuge: this is precipitous
rock, with a single approach, where they say the
deer finally stands fast and defends itself. Further,
the male when it has grown fat (and it does grow

^a Cf. VI 578b17, which is explained here.

^b Seseli, hartwort, a medicinal herb identified by Littré
ad Hipp. *acut. morb.* 7 (II. 275 L) as *Tordylium officinale*
L., often mentioned as a component of soothing drugs espe-
cially for ante- and post-natal disorders; see Littré's index
X. 791 s.v. seseli. Several varieties are described by Dios-
cur. III 53-54 and Pliny VIII 50. 112, XX 18. 36-37.

- ὀπώρας οὐσης), οὐδαμοῦ ποιεῖ αὐτὸν φανερόν
 25 ἀλλ' ἐκτοπίζει ὥς διὰ τὴν παχύτητα εὐάλωτος
 ὢν. ἀποβάλλουσι δὲ καὶ τὰ κέρατα ἐν τόποις
 χαλεποῖς καὶ δυσεξευρέτοις· ὅθεν καὶ ἡ παροι-
 μία γέγονεν "οὐ αἱ ἔλαφοι τὰ κέρατα ἀποβάλ-
 λουσιν"· ὥσπερ γὰρ τὰ ὅπλα ἀποβεβληκυῖαι φυ-
 λάττονται ὀραῖσθαι. λέγεται δ' ὥς τὸ ἀριστερόν
 30 κέρας οὐδεὶς πω ἑώρακεν· ἀποκρύπτειν γὰρ αὐτὸ
 ὥς ἔχον τινὰ φαρμακείαν. οἱ μὲν οὖν ἐνιαύσιοι οὐ
 φύουσι κέρατα πλὴν ὥσπερ σημείου χάριν ἀρχὴν
 τινα· τοῦτο δ' ἐστὶ βραχὺ καὶ δασύ. φύουσι δὲ
 διετεῖς πρῶτον τὰ κέρατα εὐθέα, καθάπερ πατ-
 τάλους· διὸ καὶ καλοῦσι τότε πατταλίας αὐτούς.
 35 τῷ δὲ τρίτῳ ἔτει δίκρουν φύουσι, τῷ δὲ τετάρτῳ
 611b τραχύτερον· καὶ τοῦτον τὸν τρόπον αἰεὶ ἐπιδι-
 δόασι μέχρι ἑξ ἑτῶν. ἀπὸ τούτου δὲ ὅμοια αἰεὶ
 ἀναφύουσιν, ὥστε μηκέτι ἂν γινῶναι τὴν ἡλικίαν
 τοῖς κέρασιν, ἀλλὰ τοὺς γέροντας γνωρίζουσι μά-
 λιστα δυοῖν σημείων· ὀδόντας τε γὰρ οἱ μὲν
 ὅλως¹ οὐκ ἔχουσιν οἱ δ' ὀλίγους, καὶ τοὺς ἀμυν-
 5 τήρας οὐκέτι φύουσιν. καλοῦνται δ' ἀμυντήρες
 τὰ προνενευκότα τῶν φυομένων κεράτων εἰς τὸ
 πρόσθεν, οἷς ἀμύνεται· ταῦτα δ' οἱ γέροντες οὐκ

¹ om. α γ (exc. L^{rec.}) Bk.

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very fat during the fruit season^a) does not show itself anywhere but keeps away because its fatness makes it easy to catch. They also cast their horns in places that are awkward and hard to find: from this has come the proverb "where the deer cast their horns"; for, as having cast away their weapons, they avoid being seen. It is said that nobody has yet seen the left^b horn: they are said to hide it as possessing some medicinal property. Now in their first year they do not grow horns except a sort of starting point as a token: this growth is short and hairy. In their second year they grow the horns for the first time, straight like pegs; hence they are called peggers. In the third year they grow them bifurcated, and in the fourth year rougher^c and in this manner they keep increasing up to six years. After that they grow them the same again each time, so that one could no longer tell their age by the horns, but the old deer are recognised chiefly by two signs: they have few teeth or none at all, and they no longer grow the defenders. The name "defenders" is given to the forward-bent tips of the growing horns, by which they defend themselves: these the old

^a Cf. VI 579a6 "in summer".

^b All other reports make it the *right* horn and say that the deer buries it (Arist. *mirab.* 75 835b27, Thphr. fr. 175 W, Antig. *mirab.* XX 24, Pliny VIII 50. 115, Aelian III 17, Ar. Byz. *epit.* II 488).

^c "Rougher" has probably replaced a word for trifurcate, which Gaza reads.

- ἔχουσιν. ἀλλ' εἰς τὸ ὀρθὸν γίνεται ἡ αὔξησις αὐ-
 τοῖς τῶν κεράτων. ἀποβάλλουσι δ' ἀνὰ ἕκαστον
 ἐνιαυτὸν τὰ κέρατα. ἀποβάλλουσι δὲ περὶ τὸν
 10 Θαργηλιῶνα μῆνα. ὅταν δ' ἀποβάλωσι, κρύπ-
 τουσιν αὐτοὺς τὴν ἡμέραν, ὥσπερ εἴρηται· κρύπ-
 τουσι δ' ἐν τοῖς δασέσιν, εὐλαβούμενοι τὰς μυίας.
 νέμονται δὲ τὸν χρόνον τοῦτον νύκτωρ, μέχριπερ
 ἂν ἐκφύσωσι τὰ κέρατα. φύεται δ' ὥσπερ ἐν
 δέρματι τὸ πρῶτον, καὶ γίνονται δασέα· ὅταν δ'
 15 αὐξηθῶσιν, ἡλιάζονται ἵν' ἐκπέμψωσι¹ καὶ ξηρά-
 νωσι τὸ κέρας. ὅταν δὲ μηκέτι πονῶσι πρὸς τὰ
 δένδρα κνώμενοι αὐτά, τότε ἐκλείπουσι τοὺς τό-
 πους τούτους διὰ τὸ θαρρεῖν ὥς ἔχοντες ᾧ ἀμύ-
 νονται.² ἤδη δ' εἴληπται ἀχαίνης ἔλαφος ἐπὶ
 τῶν κεράτων ἔχων κιττὸν πολὺν πεφυκότα χλω-
 20 ρόν, ὥς ἀπαλῶν ὄντων τῶν κεράτων ἐμφύντα
 ὥσπερ ἐν ξύλῳ χλωρῷ. ὅταν δὲ δηχθῶσιν αἱ
 ἔλαφοι ὑπὸ φαλαγγίου ἢ τινος τοιοῦτου, τοὺς
 καρκίνους συλλέγουσαι ἐσθίουσιν· δοκεῖ δὲ τοῦτο³
 καὶ ἀνθρώπῳ ἀγαθὸν εἶναι πίνειν, ἀλλ' ἔστιν
 ἀηδές. αἱ δὲ θήλειαι τῶν ἐλάφων ὅταν τέκωσιν
 εὐθὺς κατεσθίουσι τὸ χόριον, καὶ οὐκ ἔστι λαβεῖν·

¹ C^arec. A^apr. F^a X^c, D^a O^cpr. T^c R^c, Ppr. K^c M^c: incert.
 S^c: ἐκπέμψωσι cett. Ald. Bk.

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stags do not have, but the growth of their horns is straight upwards. They cast their horns every year, and the casting is around the month Thargelion.^a After casting, they hide themselves by day, as we have said.^b They hide in the thick undergrowth, avoiding the flies. During this time they feed by night, until their horns have grown out. They grow at first in a kind of skin, and become hairy; but when they have increased in size, the deer sun themselves so as to grow and dry out the horn. And when it is no longer painful to rub them on the trees, then they leave those places because they feel confident since they have means of defence. And before now an Achain^c deer has been caught with much green ivy growing on its horns, showing that the horns were tender when it was implanted as if in green wood. And when deer have been bitten by a venom-spider or something similar, they collect crabs and eat them; this is held to make a drink that is good for man too, but it is unpleasant. The female deer after giving birth immediately eat the chorion, and one cannot get it because they take hold of it

^a About May (see Vol. II, App. B). ^b611a28.

^c Probably another word for a second-year stag (but Keller I. 278 suggests that it may mean Achaeian, denoting high quality). See Th. ad loc., Sn. IV. 35.

² codd. Ald.: ἀμυνοῦνται Sylb. edd. (cf. *Mirab.* 830b25)

³ τοῦτο post εἶναι transp. γ Bk.: post πένε α (exc. Ca)

25 πρὸ γὰρ τοῦ χαμαὶ βαλεῖν αὐταὶ¹ ἄπτονται·
 δοκεῖ δὲ τοῦτ' εἶναι φάρμακον. ἀλίσκονται δὲ
 θηρευόμεναι αἱ ἔλαφοι συριττόντων καὶ ἁδόντων,
 ὥστε² καὶ κατακλίνονται ὑπὸ τῆς ἡδονῆς. δύο
 δ' ὄντων ὁ μὲν φανερώς ἅδει ἢ συρίττει, ὁ δ' ἐκ
 τοῦ ὀπισθεν βάλλει ὅταν οὗτος σημήνη τὸν και-
 30 ρόν. εἰ μὲν οὖν τύχῃ ὀρθὰ τὰ ὦτα ἔχουσα, ὁξὺ
 ἀκούει καὶ οὐκ ἔστι λαθεῖν· εἰ δὲ καταβεβλη-
 κυῖα τύχῃ, λανθάνει.

VI αἱ δ' ἄρκτοι ὅταν φεύγωσι τὰ σκυμνία προ-
 ωθοῦσι καὶ ἀναλαβοῦσαι φέρουσιν· ὅταν δ' ἐπι-
 καταλαμβάνωνται, ἐπὶ τὰ δένδρα ἀναπηδῶσιν.
 35 καὶ ὅταν ἐκ τοῦ φωλεοῦ ἐξέλθωσι, πρῶτον τὸ
 612a ἄρον ἐσθίουσιν, ὥσπερ εἴρηται πρότερον, καὶ τὰ
 ξύλα διαμασῶνται ὥσπερ ὀδοντοφυοῦσαι.

πολλὰ δὲ καὶ τῶν ἄλλων ζώων τῶν τετρα-
 πόδων ποιεῖ πρὸς βοήθειαν αὐτοῖς φρονίμως, ἐπεὶ
 καὶ ἐν Κρήτῃ φασὶ τὰς αἰγας τὰς ἀγρίας ὅταν
 τοξευθῶσι ζητεῖν τὸ δίκταμνον· δοκεῖ δὲ τοῦτο
 5 ἐκβλητικὸν εἶναι τῶν τοξευμάτων ἐν τῷ σώματι.
 καὶ αἱ κύνες δ' ὅταν τι πονῶσιν ἔμετον ποιοῦσι³
 φαγοῦσαί τινα πόαν. ἡ δὲ πάρδαλις, ὅταν φάγῃ

¹ α β L^c Ald.: αὐταὶ γ (exc. L^c) edd.: *ipsae* Guil.

² om. α γ (exc. L^c rec.) Bk.

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before it has fallen to the ground; and this is held to be a medicine. When hunted the deer are caught by pipe-playing and singing, so that the pleasure of it makes them lie down. There are two hunters, one of whom sings or pipes in the open, while the other shoots from behind when the former has signalled the opportunity. Now if the deer happens to have its ears upright, it hears acutely and one cannot surprise it; but if it happens to have them laid back, one can.

When bears are in flight they push their cubs in front and pick them up and carry them; and when they are being overtaken they leap up into the trees. And after coming out of the hibernation-place they first eat arum,^a as we said earlier, and chew sticks as though cutting teeth. VI

Many other animals that are quadruped act intelligently too to help themselves, for example in Crete they say the wild goats when struck by arrows look for dittany; this is believed to have the effect of expelling arrows in the body.^b And when hounds have a certain pain they make themselves vomit by eating a particular grass.^c And the panther after

^a Cuckoo-pint; cf. VII(VIII) 600b11.

^b Cf. VII(VIII) 605b3.

^c Cf. VII(VIII) 594a29.

³ β Ald.: ποιοῦνται α γ Bk.

- τὸ φάρμακον ὃ καλεῖται παρδαλιαγχές,¹ ζητεῖ
τὴν τοῦ ἀνθρώπου κόπρον· βοηθεῖ γὰρ αὐτῇ.
διαφθείρει δὲ τοῦτο τὸ φάρμακον καὶ λέοντας.
10 διὸ καὶ οἱ κυνηγοὶ κρεμαννύουσιν ἐν ἀγγείῳ ἕκ-
τινος δένδρου τὴν κόπρον, ὅπως μὴ ἀποχωρῇ
μακρὰν τὸ θηρίον· αὐτοῦ γὰρ προσαλλομένη ἡ
πάρδαλις καὶ ἐλπίζουσα λήψεσθαι τελευτᾷ. λέ-
γουσι δὲ καὶ κατανενοηκυῖαν τὴν πάρδαλιν ὅτι
τῇ ὁσμῇ αὐτῆς χαίρουσι τὰ θηρία, ἀποκρύπτου-
15 σαν ἑαυτὴν θηρεύειν· προσιέναι γὰρ ἐγγύς, καὶ
λαμβάνειν οὕτω καὶ τὰς ἐλάφους. ὁ δ' ἰχνεύμων
ὁ ἐν Αἰγύπτῳ ὅταν ἴδῃ τὸν ὄφιν τὴν ἀσπίδα
καλουμένην, οὐ πρότερον ἐπιτίθεται πρὶν συγκα-
λέσῃ βοηθοὺς ἄλλους· πρὸς δὲ τὰς πληγὰς καὶ
τὰ δῆγματα πηλῷ καταπλάττουσιν ἑαυτούς·
20 βρέξαντες γὰρ ἐν τῷ ὕδατι πρῶτον, οὕτω καλιν-
δοῦνται ἐν τῇ γῇ. τῶν δὲ κροκοδείλων χασκόν-
των οἱ τροχίλοι καθαίρουσιν εἰσπετόμενοι τοὺς
ὀδόντας, καὶ αὐτοὶ μὲν τροφὴν λαμβάνουσιν, ὁ δ'
ὠφελούμενος αἰσθάνεται καὶ οὐ βλάπτει, ἀλλ'
ὅταν ἐξελθεῖν βούληται κινεῖ τὸν ἀνχένα ἵνα μὴ
συνδάκῃ. ἡ δὲ χελώνη, ὅταν ἔχεως φάγῃ, ἐπ-
25 εσθίει τὴν ὀρίγανον· καὶ τοῦτο ὥπται. καὶ ἤδη
κατιδὼν τις τοῦτο πολλάκις ποιούσαν αὐτὴν, καὶ

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eating the drug called panther-bane looks for human dung, for this helps it. This drug kills lions too. Therefore the hunters hang up the dung in a container on some tree, so that the beast should not go far away; for while jumping up there, in hopes of getting it, the panther dies. They say too that the panther has learned that wild animals like her scent, and hunts them by concealing herself: they come near, and thus she catches even the deer. When the Egyptian ichneumon sees the snake called the asp it does not attack until it has summoned others to help. Against its strikes and bites they plaster themselves with mud: after first soaking themselves in water they roll on the ground. When crocodiles gape the trochilos^a fly in and clean their teeth, and while they themselves are getting their food the crocodile perceives that he is being benefited and does not harm them, but when he wants them to go he moves his neck so as not to crush them in his teeth. When the tortoise has eaten some of a viper it eats origanum as well: this has actually been seen. And once when a man had observed a tortoise doing this several times and

^a Crocodile bird; cf. VII(VIII) 593b11 note.

¹ ὃ καλεῖται παρδ. β: τὸ παρδ. α γ Ald. edd.: τὸ καλούμενον παρδ. Sc: *quod vocatur pard.* Guil.: *pard. dictum Gaza*

ὅταν¹ ἐγκάψῃ² τῆς ὀριγάνου πάλιν ἐπὶ τὸν ἔχιν
 πορευομένην, ἐξέτιλλε³ τὴν ὀρίγανον· τούτου δὲ
 συμβάντος ἀπέθανεν ἡ χελώνη. ἡ δὲ γαλῆ⁴
 ὅταν ὄφει μάχεται ἐπεσθίει τὸ πηγανον· πολε-
 30 μία γὰρ ἡ ὁσμὴ τοῖς ὄφεσιν. ὁ δὲ δράκων ὅταν
 ὀπωρίζῃ τὸν ὀπὸν τῆς πικρίδος ἐκροφεῖ, καὶ
 τοῦθ' ἐώραται ποιῶν. αἱ δὲ κύνες ὅταν ἐλμιν-
 θιῶσιν ἐσθίουσι τοῦ σίτου τὸ λήιον. οἱ δὲ πελαρ-
 γοὶ καὶ οἱ ἄλλοι τῶν ὀρνίθων, ὅταν ἐλκωθῇ τι
 μαχομένοις, ἐπιτιθέασιν τὴν ὀρίγανον. πολλοὶ δὲ
 35 καὶ τὴν ἀκρίδα ἐωράκασιν ὅτι ὅταν μάχεται τοῖς
 ὄφεσι λαμβάνεται τοῦ τραχήλου τῶν ὄφεων.
 612b φρονίμως δὲ δοκεῖ καὶ ἡ γαλῆ χειροῦσθαι τοὺς
 ὀρνίθους· σφάζει γὰρ ὥσπερ οἱ λύκοι τὰ πρόβατα.
 μάχεται δὲ καὶ τοῖς ὄφεσι μάλιστα τοῖς μυοθή-
 ραις διὰ τὸ καὶ αὐτὴν τοῦτο τὸ ζῶον θηρεύειν.
 περὶ δὲ τῆς τῶν ἐχίνων αἰσθήσεως συμβέβηκε
 5 πολλαχοῦ τεθεωρηῆσθαι ὅτι μεταβαλλόντων
 βορέων καὶ νότων οἱ μὲν ἐν τῇ γῇ τὰς ὅπας
 αὐτῶν⁵ μετακινοῦσιν,⁶ οἱ δ' ἐν ταῖς οἰκίαις τρε-
 φόμενοι μεταβάλλουσι πρὸς τοὺς τοίχους, ὥστ'

¹ ἐπειδὴ L^c Ald.: ὅτε conl. Bk. Dt.

² ἐγκάψῃ β: ἔκαψεν E^a Ppr. K^c M^c: ἔγκαψεν P^{rec}: ἔκαψε
 n: ἔφαγε mcorr. (incert. mpr.): γευσασμένη L^c Ald.: ἔσπασε α:

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going back to the viper after each mouthful of origanum, he began stripping the leaves off the origanum; and when this had happened the tortoise died. When the weasel fights a snake it eats rue too, for its smell is inimical to snakes. When the dragon-snake eats fruit it sucks the juice of pikris,^a and has been seen doing this. When hounds have worms they eat the standing corn. Storks and the other birds, when they have a wound from fighting, apply origanum to it. Many have seen that even the locust,^b when fighting with snakes, takes hold of the snake's neck. The weasel too seems to use intelligence in overcoming birds, for it tears their throats as wolves do to the flocks. It also fights especially against the mouse-hunting snakes because it too hunts the same animal. With regard to perception in hedgehogs, observations in many places have concurred that when there is a change between north and south winds those that live in the ground move their entrance holes, while those that are kept in the houses change place in relation to the walls, so

^a Various identified as *Urospermum picroides* (Hort, Index to Loeb Thphr. *HP*, cf. *HP* VII 11. 4); *Helminthia sepioides* (LSJ s.v.); wild lettuce, *silvestris lactuca* (Pliny VIII 41. 99).

^b ἀκρίς, a common word, may denote grasshopper or cricket, etc. Arist.'s expression "many have seen" may be taken to imply the caution "but I have not".

cum accepisset Guil.: *gustata* Gaza: σπάσαι coni. Bk.

³ ἐξέτιλε α Bk.: ἐξέτερε G^apr. Qpr. ⁴ γαλή edd.

⁵ codd.: αὐτῶν edd. ⁶ β γ Ald.: μεταμείβουσιν α Sn. Bk.

ἐν Βυζαντίῳ γέ τινά φασι προλέγοντα λαβεῖν
δόξαν ἐκ τοῦ κατανενοηκέναι ποιοῦντα ταῦτα
τὸν ἐχῖνον.

- 10 ἡ δ' ἵκτις ἔστι μὲν τὸ μέγεθος ἡλίκον Μελι-
ταῖον¹ κυνίδιον τῶν μικρῶν, τὴν δὲ δασύτητα καὶ
τὴν ὄψιν καὶ τὸ λευκὸν τὸ ὑποκάτω καὶ τοῦ
ἥθους τὴν κακουργίαν ὅμοιον γαλῇ· καὶ τιθασσὸν
δὲ γίνεται σφόδρα, τὰ δὲ σμήνη κακουργεῖ· τῷ
γὰρ μέλιτι χαίρει. ἔστι δὲ καὶ ὀρνιθοφάγον
15 ὥσπερ αἱ αἰλουροι. τὸ δ' αἰδοῖον αὐτῆς ἔστι μὲν,
ὥσπερ εἴρηται, ὁστοῦν, δοκεῖ δ' εἶναι φάρμακον
στραγγουρίας τὸ τοῦ ἄρρενος· διδόασιν δ' ἐπι-
ξύνοντες.

- VII ὅλως δὲ περὶ τοὺς βίους πολλὰ ἂν θεωρηθεῖη
μιμήματα τῶν ἄλλων ζώων τῆς ἀνθρωπίνης
20 ζωῆς, καὶ μᾶλλον ἐπὶ τῶν ἐλαττόνων ἢ ἐπὶ τῶν
μειζόνων² ἴδοι τις ἂν τὴν τῆς διανοίας ἀκρίβειαν,
οἶον πρῶτον ἐπὶ τῶν ὀρνίθων ἢ τῆς χελιδόνος
σκηνοπηγία· τῇ γὰρ περὶ τὸν πηλὸν ἀχυρώσει
τὴν αὐτὴν ἔχει τάξιν. συγκαταπλέκει γὰρ τοῖς
κάρφεσι τὸν³ πηλόν· καὶ ἀπορῆται πηλοῦ,
25 βρέχουσα αὐτὴν καλινδεῖται τοῖς πτεροῖς πρὸς
τὴν κόνιν. ἔτι δὲ στιβαδοποιεῖται καθάπερ οἱ

¹ C^a & E^a Ppr.: μελιταῖον cett. edd.

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that in Byzantium somebody is actually said to have gained fame as a forecaster through observing this practice of the hedgehog.

The marten is about the size of the small kind of Melitaeen miniature dog,^a and is like a weasel in its thick coat and appearance and white underbelly and in its vicious character. Moreover it becomes very tame, but it damages the bee-hives for it loves honey. It is a bird-eater too like the cats. Its genitalia are bony, as we have said,^b and that of the male is held to be a remedy for strangury: they give it by grating it.

In general, with regard to their lives, one may observe many imitations of human life in the other animals, and more especially in the smaller than in the larger animals one may see the precision of their intelligence: for example, first, in the case of the birds, the swallow's nest-building.^c For in the mixing of straw into mud she keeps the same order. She interweaves mud with the stalks; and if she lacks mud she moistens herself and rolls her feathers into the dust. Further, she builds the nest just as men

VII

^a A popular lap-dog, named according to Pliny III 26. 152 from the island of Melite (now Meleda) off Dalmatia; acc. to Strabo VI 2. 11, they come from Malta. See Forster's note at *Probl.* X 892a21 (Oxf. trs.).

^b II 500b24, cf. *Mirab.* 12 831b1.

^c Cf. *Phys.* II 199a26.

² ἡ ἐπὶ τῶν μελῶ. β: ἡ μελῶ. α γ Ald. Bk.

³ β: om. α γ Ald. Bk.

ἄνθρωποι, τὰ σκληρὰ πρῶτα ὑποτιθεῖσα καὶ τῷ
 μεγέθει σύμμετρον ποιοῦσα πρὸς αὐτήν. περί τε
 τὴν τροφήν τῶν τέκνων ἐκπονεῖται ἀμφοτέρω·
 δίδωσι δ' ἑκατέρω διατηροῦσά τινι συνηθείᾳ τὸ
 προειληφός, ὅπως μὴ δις λάβῃ. καὶ τὴν κόπρον
 30 τὸ μὲν πρῶτον αὐταὶ ἐκβάλλουσιν, ὅταν δ' αὖξη-
 θῶσι μεταστρέφοντας ἔξω διδάσκουσι τοὺς νεοτ-
 τοὺς προίεσθαι.

περί τε τὰς περιστερὰς ἔστιν ἕτερα τοιαύτην
 ἔχοντα τὴν θεωρίαν· οὔτε γὰρ συνδυάζεσθαι θέ-
 λουσι πλείοσιν, οὔτε προαπολείπουσι τὴν κοινω-
 νίαν, πλὴν ἐὰν χῆρος ἢ χήρα γένηται. ἔστι¹ δὲ
 35 περὶ τὴν ὠδῖνα δεινὴ ἢ τοῦ ἄρρενος θεραπεία καὶ
 613a συναγανάκτησις· ἐὰν τε ἀπομαλακίζεται πρὸς
 τὴν εἴσοδον τῆς νεοττείας² διὰ τὴν ὀχείαν,³
 τύπτει καὶ ἀναγκάζει εἰσιέναι. γενομένων δὲ
 τῶν νεοττῶν φροντίζει τῆς ἀρμοττοῦσης τροφῆς
 ἧς διαμασσησάμενος⁴ εἰσπτύει τοῖς νεοττοῖς διοιγ-
 5 νὺς τὸ στόμα, προπαρασκευάζων εἰς⁵ τὴν τρο-
 φήν. ὅταν δ' ἐκ τῆς νεοττείας⁶ ἐξάγειν μέλλῃ,

¹ β L^c Ald.: ἔτι α γ Bk.

² νεοττίας C^a Ald.: νεοττίας m edd.

³ β: λοχείαν α γ Ald. Bk.: *dolorem partus* Scot.: *coitum*

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build, putting the stiff materials underneath first, and making it match herself in size. Over the feeding of the young both birds carry out the work; they give to each, watching habitually the one that has already had it, so that it should not get it twice. And at first they themselves throw out the dung, but when the nestlings have grown they teach them to turn round and discharge it outside.

With regard to the pigeons there are other things that give scope for this kind of study. For they are neither willing to pair with more than one, nor do they abandon their partnership prematurely except through becoming a widower or widow.^a Over the birth-pangs the male cares for her and shares her distress to an extraordinary degree; and if she shows weakness towards entering the nest because of the birth, he strikes her and forces her to go in. When the nestlings have come, he gives thought to suitable food, which he chews up and opening the nestlings' mouths spits into them, preparing them in advance for feeding. When he is about to eject

^a "Widower or widow" is not pleonasm but indicates that the feeling is the same on both sides. For "widowhood" applied to birds cf. 614a1.

Guil.: *partus laborem Gaza*

⁴ νεοτῶν . . . διαμασ. β L^crec. Guil. Ald.: νεοτῶν τῆς ἀλ-
μυριζούσης μάλιστα γῆς διαμασ. α γ Scot. Gaza Ald. Bk.

⁵ β: πρὸς α γ Ald. Bk.

⁶ νεοττίας K^c m Ald.: νεοττίας M^c edd.

- πάντας ὁ ἄρρην ὀχεύει. ὥς μὲν οὖν ἐπὶ τὸ πολὺ
 τοῦτον τὸν τρόπον στέργουσιν ἀλλήλας, παροχεύ-
 ονται δέ ποτε καὶ τῶν τοὺς ἄρρενας ἐχουσῶν
 τινές. ἔστι δὲ μάχιμον τὸ ζῶον, καὶ ἐνοχλοῦσιν
 ἀλλήλας,¹ καὶ εἰς τὰς νεοττείας² παραδύονται
 10 τὰς ἀλλήλων, ὀλιγάκις μέντοι· καὶ γὰρ ἂν ἦττον
 ἄποθεν³ ἦ, ἀλλὰ παρά γε τὴν νεοττείαν διαμά-
 χονται ἐσχάτως. ἴδιον δὲ δοκεῖ⁴ ταῖς περιστε-
 ραῖς συμβεβηκέναι καὶ ταῖς φαῖσι καὶ τρυγόσι τὸ
 μὴ ἀνακύπτειν πίνοντα⁵ ἐὰν μὴ ἱκανὸν πίωσιν.
 ἔχει δὲ τὸν ἄρρενα ἢ τρυγῶν τὸν αὐτὸν καὶ
 15 φάττα, καὶ ἄλλον οὐ προσίεται.⁶ καὶ ἐπωάζου-
 σιν ἀμφοτέροι καὶ ὁ ἄρρην καὶ ἡ θήλεια. διαγνώ-
 ναι δ' οὐ ῥάδιον τὸν ἄρρενα καὶ τὴν θήλειαν⁷
 ἀλλ' ἢ τοῖς ἐντός. ζῶσι δ' αἱ φάτται πολὺν χρό-
 νον· καὶ γὰρ εἴκοσι καὶ πέντε ἔτη⁸ καὶ τριά-
 κοντα ἔτη⁹ ὠμμέναι εἰσὶν, ἔνιαι δὲ καὶ τετταρά-
 20 κοντα.¹⁰ πρεσβυτέρων δὲ γενομένων¹¹ αὐτῶν οἱ
 ὄνυχες αὐξάνονται· ἀλλ' ἀποτέμνουσιν οἱ τρέ-

¹ β γ Ald.: ἀλλήλαις α Bk.

² νεοττίας C^a edd.: νεοττίας E^a m Ald.

³ ἄποθεν ἦττον transp. α γ: ἄποθεν ἦ ἦττον m

⁴ δοκεῖ post περιστ. transp. α γ Ald. Bk.

⁵ β Guil.: πίνοντας α E^a P K^c M^c: πινούσαις F^a X^c: πινούσας
 L^c n Ald. edd.

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them from the nest, the male treads them all. Now as a rule they have this kind of family devotion to each other, but sometimes even the females that have mates are trodden by others. They are a pugnacious animal, and harass each other, and trespass into each other's nests, though not often: for although they are less pugnacious when farther away, beside the nest they fight to the death. It seems to be a peculiarity of common pigeons and wood pigeons and turtle-doves that they do not bring the head up when drinking unless they have drunk enough. The turtle-dove and wood pigeon keep the same mate and do not admit another male; and both male and female sit on the eggs. It is not easy to distinguish the male and the female except by the internal parts. The wood pigeons live a long time: twenty-five and thirty-year-olds have been seen, and some of even forty years.^a When they are older their claws grow, but the keepers trim them.

^a Cf. VI 563a1.

⁶ προσίενται α γ Ald. Bk.

⁷ τὴν θήλ. κ. τ. ἄρρ. transp. α γ Ald. Bk.

⁸ ἔτη post εἴκοσιν transp. α γ (exc. K^c) Ald. Bk.

⁹ om. P L^c Ald. Bk.

¹⁰ τεττ. ἔτη α γ Ald. Bk.

¹¹ β γ Ald.: γινομένων α Bk.

φοντες. ἄλλο δ' οὐδὲν βλάπτονται ἐπιδήλως
 γηράσκουσαι. καὶ αἱ τρυγόνες δὲ καὶ αἱ περιστε-
 ραὶ ζῶσι καὶ ὀκτῶ ἔτη αἱ τετυφλωμένοι ὑπὸ τῶν
 παλευτρίας τρεφόντων αὐτάς. ζῶσι δὲ καὶ οἱ
 πέρδικες περὶ πεντεκαίδεκ' ἔτη. νεοττεύουσι δὲ
 25 καὶ αἱ φάβες καὶ αἱ τρυγόνες ἐν τοῖς αὐτοῖς
 τόποις αἰεῖ. πολυχρονιώτερα δ' ὅλως μὲν ἔστι τὰ
 ἄρρενα τῶν θηλέων, ἐπὶ δὲ τούτων τελευτᾶν
 φασὶ τινες πρότερον τὰ ἄρρενα τῶν θηλέων,
 τεκμαιρόμενοι ἐκ τῶν κατ' οἰκίαν τρεφομένων
 παλευτριῶν. λέγουσι δὲ τινες καὶ τῶν στρουθίων
 30 ἐνιαυτὸν μόνον ζῆν τοὺς ἄρρενας, ποιοῦμενοι ση-
 μεῖον ὅτι τοῦ ἔαρος οὐ φαίνονται ἔχοντες εὐθὺς
 τὰ περὶ τὸν πώγωνα μέλανα, ὕστερον δ' ἴσχου-
 σιν, ὥς οὐδενὸς σωζομένου τῶν προτέρων· τὰς δὲ
 θηλείας μακροβιωτέρας εἶναι τῶν στρουθίων·
 613b ταύτας γὰρ ἀλίσκεσθαι ἐν τοῖς νέοις καὶ διαδή-
 λας εἶναι τῷ ἔχειν τὰ περὶ τὰ χεῖλη σκληρά.
 διάγουσι δ' αἱ μὲν τρυγόνες τοῦ θέρους ἐν τοῖς
 χειμερίοις, [τοῦ δὲ χειμῶνος ἐν τοῖς ἀλεεινοῖς,]¹

¹ τοῦ . . . ἀλεεινοῖς L^c n Ald. Gaza edd.: om. codd. cett. Scot. Guil. Ott.

^a Arist. has conflicting reports on the migration/hibernation of turtle-doves and other pigeons (cf. 593a17, 597b3, 600a20). Here two MSS with Gaza and the Aldine

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They show no other impairment in old age. Further, the turtle-doves and the common pigeons that have been blinded by those who rear them as decoys live as long as eight years. And the partridges live about fifteen years. The wood pigeons and turtle-doves always nest in the same places. In general males are longer-lived than females, but in the case of these birds some say the males die earlier than the females, judging from the decoys reared in the house. Some say too that the male sparrows live only a year, taking as evidence that in spring they are not seen with the black growth round the beard straightaway, but acquire it later, suggesting that none of the previous birds survives. And they say the female sparrows are longer lived, for they are caught among the young birds and are recognised by having the hard parts about the beak. The turtle-doves spend their time in summer in the wintry places,^a whereas the chaffinches are in the warm

(see app. crit.) add "and in winter in the warm places", agreeing with 597b4. However, 597b6 added that some turtle-doves are left behind in winter, in sunny places. Therefore the point of this comparison may be not migration/residence but the contrasting behaviour of residents: the resident turtle-dove chooses cool spots in summer, whereas the resident chaffinch accepts the heat or cold where it is. The chaffinch is a common standard of comparison. The addition, therefore, while not incorrect, is unnecessary and could mislead the reader into thinking that the turtle-dove and chaffinch migrate in opposite directions, which Arist. would know to be untrue.

αἱ δὲ σπίζαι τοῦ μὲν θέρους ἐν τοῖς ἀλεεινοῖς τοῦ
δὲ χειμῶνος ἐν τοῖς ψυχροῖς.

- VIII οἱ δὲ βαρεῖς τῶν ὀρνίθων οὐ ποιοῦνται νεοτ-
7 τείας (οὐ συμφέρει γὰρ μὴ πτητικοῖς οὖσιν), οἷον
ὄρνυγες καὶ πέρδικες καὶ τᾶλλα τὰ τοιαῦτα τῶν
ὀρνέων· ἀλλ' ὅταν ποιήσωνται ἐν τῷ λείῳ κονί-
στραν (ἐν ἄλλῳ γὰρ τόπῳ οὐθενὶ τίκτει), ἐπηλυ-
10 γασάμενοι ἄκανθάν τινα καὶ ὕλην τῆς πρὸς¹ τοὺς
ἰέρακας ἔνεκα καὶ τοὺς αἰετοὺς ἀλεώρας, ἐνταῦθα
τίκτουσι καὶ ἐπωάζουσιν. ἔπειτα ἐκλέψαντες
εὐθὺς ἐξάγουσι τοὺς νεοττοὺς διὰ τὸ μὴ δύνασθαι
τῇ πτήσει πορίζειν αὐτοῖς τροφήν. ἀναπαύονται
δ' ὑφ' ἑαυτοὺς ἀγόμενοι τοὺς νεοττοὺς καὶ οἱ ὄρ-
15 τυγες καὶ οἱ πέρδικες ὥσπερ αἱ ἀλεκτορίδες. καὶ
οὐκ ἐν τῷ αὐτῷ τίκτουσι καὶ ἐπωάζουσιν, ἵνα μὴ
τις κατανοήσῃ τὸν τόπον πλείῳ χρόνον προσ-
εδρευόντων. ὅταν δέ τις θηρεύῃ περιπεσὼν τῇ
νεοττεία,² προκυλινδεῖται ἢ πέρδιξ τοῦ θηρεύον-
τος ὡς ἐπίληπτος οὔσα, καὶ ἐπισπᾶται ὡς ληψό-
20 μενον ἐφ' ἑαυτήν, ἕως ἂν διαδράσῃ τῶν νεοττῶν
ἕκαστος· μετὰ δὲ ταῦτα ἀναπτᾶσα αὐτὴ ἀνακα-
λεῖται πάλιν. τίκτει μὲν οὖν ᾧ δ³ πέρδιξ οὐκ
ἐλάττω ἢ δέκα, πολλάκις δ' ἑκκαίδεκα. ὥσπερ
δ' εἴρηται, κακότηες τὸ ὀρνεόν ἐστι καὶ πανοῦρ-

places in summer and the cold places in winter.

The heavy birds do not make nests^a for themselves (for it does not benefit them if they are not habitual fliers), for example quails and partridges and the other birds of this sort; but after making a rolling-place in dust on level ground (for they lay eggs in no other place) and screening it with thorns and sticks for protection against the hawks and eagles, they lay and incubate there. Next, as soon as they are hatched they lead the nestlings out since they cannot provide food for them by flying. Both quails and partridges, like common fowls, bring the nestlings under them when they are resting. And they do not keep to the same place for laying and incubating, in case the place might be discovered if they sat over it for too long. When one chances upon the nest and goes to catch them, the partridge rolls along in front of the hunter as though easy to catch, and draws him on towards herself as though he is about to catch her, until all the nestlings have scattered; after that she herself flies up and recalls them. Now the partridge lays not less than ten eggs, often sixteen. As we have said,^b the bird has a

VIII

^a Cf. VI 558b31.

^b No obvious place, but perhaps refers to the immediately preceding account of the bird's tricks. Its 'wickedness' is mentioned again at 614a30.

¹ β Guil.: $\pi\epsilon\rho\iota\ \alpha\ \gamma$ Ald. edd.

² $\nu\epsilon\omicron\tau\tau\acute{\iota}\alpha$ m Ald.: $\nu\epsilon\omicron\tau\tau\iota\grave{\alpha}$ edd.

³ η L^c n Ald. edd.

γον. τοῦ δ' ἔαρος ἐκ τῆς ἀγέλης ἐκκρίνονται δι'
 25 ὠδῆς καὶ μάχης κατὰ ζεύγη μετὰ θηλείας ἦν ἂν
 λάβῃ ἕκαστος. διὰ δὲ τὸ εἶναι ἀφροδισιαστικοί,
 ὅπως μὴ ἐπωάζῃ ἡ θήλεια, οἱ ἄρρενες τὰ ὦα
 διακυλινδοῦσι καὶ συντρίβουσιν ἐὰν εὗρωσιν· ἡ δὲ
 θήλεια ἀντιμηχανωμένη ἀποδιδράσκουσα τίκτει,
 καὶ πολλάκις διὰ τὸ ὀργᾶν τεκεῖν ὅπου ἂν τύχῃ
 30 ἐκβάλλει, ἂν παρῇ¹ ὁ ἄρρην, καὶ ὅπως σώζῃται
 ἀθρόα οὐκ ἔρχεται πρὸς αὐτά. καὶ ἐὰν ὑπ' ἀν-
 θρώπου ὀφθῇ, ὥσπερ περὶ τοὺς νεοττοὺς οὕτω
 καὶ ἀπὸ τῶν ὤων ὑπάγει, πρὸ ποδῶν φαινομένη
 τοῦ ἀνθρώπου, ἕως ἂν ἀπαγάγῃ. ὅταν δ' ἀπο-
 614a δρᾷσα ἐπωάζῃ, οἱ ἄρρενες κεκράγασι καὶ μάχον-
 ται συνιόντες· καλοῦσι δὲ τούτους χήρους. ὁ δ'
 ἡττηθεὶς μαχόμενος ἀκολουθεῖ τῷ νικήσαντι, ὑπὸ
 τούτου ὀχευόμενος μόνου. ἐὰν δὲ κρατηθῇ τις
 ὑπὸ τοῦ δευτέρου ἢ ὁποιοιοῦν, οὗτος λάθρα ὀχεύ-
 5 εται ὑπὸ τοῦ κρατιστεύοντος. γίνεται δὲ τοῦτο
 οὐκ αἰεὶ ἀλλὰ καθ' ὥραν τινὰ τοῦ ἔτους· καὶ
 ἐπὶ τῶν ὀρτύγων ὡσαύτως. ἐνίοτε δὲ συμβαίνει
 τοῦτο καὶ ἐπὶ τῶν ἀλεκτρυόνων· ἐν μὲν γὰρ τοῖς
 ἱεροῖς, ὅπου ἄνευ θηλειῶν ἀνάκεινται, τὸν ἀνα-
 τιθέμενον πάντες εὐλόγως ὀχεύουσιν. καὶ τῶν
 περδίκων δ' οἱ τιθασσοὶ τοὺς ἀγρίους πέρδικας

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bad character and wicked tricks. In the spring they separate out of the covey, by means of calling and fighting, in pairs with whichever female each has taken. And because they are lecherous, to prevent the female from sitting, the males roll the eggs about and smash them if they find them.^a But the female, as a counter-measure, lays while running away, and often in her excitement for laying she drops them at random if the male is near; and hoping to preserve the clutch, she does not go to them. And if she is seen by a man, then just as she does with the nestlings so too she entices him away from the eggs by appearing in front of the man's feet until she has led him away. When she sits on eggs after running away, the males scream and join battle together; they are then called widowers. The one who has been defeated in the battle follows the victor and is trodden only by him. But if one is conquered by the second bird or by any other, this one is trodden by the conqueror in secret. This does not happen all the time but at a particular season of the year; and the same with quails. Sometimes this happens also with the domestic cocks; for in the temples, where they are presented as offerings without females, they all tread the newly presented one, as is understandable. And among the partridges the tame males tread the wild males and

^a Contrast VI 564a20.

¹ ante παρῆ add. μῆ C^arec. Sn. Bk.

- 10 ὀχεύουσι καὶ ἐπικορίζουσι καὶ ὑβρίζουσιν. ἐπὶ δὲ
τὸν θηρευτὴν πέρδικα ὠθεῖται τῶν ἀγρίων ὁ ἡγε-
μὼν ἀντιάσας¹ ὡς μαχόμενος.² τούτου δ' ἀλόν-
τος ἐν ταῖς πηκταῖς πάλιν προσέρχεται ἄλλος
ἀντιάσας³ τὸν αὐτὸν τρόπον. εἰ μὲν οὖν ἄρρην
ἦ ὁ θηρεύων, τοῦτο ποιοῦσιν· εἰ δὲ θήλεια ἦ ἡ
15 θηρεύουσα⁴ καὶ ἄδουσα, ἀντιάσῃ⁵ δ' ὁ ἡγεμὼν
αὐτῇ, οἱ ἄλλοι ἀθροισθέντες τύπτουσι καὶ ἀπο-
διώκουσιν τοῦτον⁶ ἀπὸ τῆς θηλείας, ὅτι ἐκείνη
ἀλλ' οὐκ αὐτοῖς προσέρχεται. ὁ δὲ πολλάκις διὰ
ταῦτα σιωπῇ προσέρχεται, ὅπως μὴ ἄλλος ἀκού-
σας τῆς φωνῆς⁷ ἔλθῃ μαχόμενος⁸ αὐτῷ. ἐνίοτε
δέ φασιν οἱ ἔμπειροι τὸν ἄρρενα προσιόντα τὴν
20 θήλειαν κατασιγάζειν, ὅπως μὴ ἀκουσάντων τῶν
ἄρρένων ἀναγκασθῇ διαμάχεσθαι πρὸς αὐτούς.
οὐ μόνον δ' ἄδει ὁ πέρδιξ ἀλλὰ καὶ τριγμὸν
ἀφίησι καὶ ἄλλας φωνάς. πολλάκις δὲ καὶ ἡ
θήλεια ἐπαράζουσα ἀνίσταται ὅταν τῇ θηρευούσῃ
θηλεῖα αἰσθηται προσέχοντα τὸν ἄρρενα, καὶ
25 ἀντιάσασα⁹ ὑπομένει, ἵν' ὀχευθῇ καὶ ἀποσπάσῃ

¹ codd. Guil. Gaza Ald.: ἀντάσας coni. Sn. edd.

² μαχοόμενος L^c Ald. Bk.

³ cett.: om. L^c pr.: ἀντάσας coni. edd.

⁴ ἦ ἡ θηρεύουσα β: ἡ θηρ. ἦ α γ Bk.

⁵ ἀντιάσῃ codd.: cantabit Guil.: ἀντάσῃ coni. edd.

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abuse and maltreat them. Against the hunting partridge^a the leader of the wild partridges thrusts forward in a counter-challenge to battle. After he has been caught in the nets another comes forward in turn with a similar counter-challenge. Now if the hunting bird is a male, that is what they do; but if it is a female that is hunting and calling, and if the leader counter-challenges her, the others crowd round and strike him and chase him away from the female because he is approaching her instead of them. But because of this he often approaches in silence so that no other may hear his voice and attack him. The experts say that sometimes the male while approaching compels the female to keep silent, to avoid having to fight the males if they heard. The partridge not only calls but also utters a scream and other sounds.^b Often too the female when sitting on eggs stands up after she has perceived the male paying attention to the hunting female, and counter-challenges and resists, so as

^a The live decoy.

^b Cf. IV 536b14, Athen. IX 390A. This report of the partridge's different calls led to the discovery of two distinct populations (rock partridge and chukar) living side by side in N. Greece: see G. E. Watson, "Three sibling species of *Alectoris* Partridge", *Ibis* 104 (1962) 353.

⁶ τοῦτον post τύπτουσι transp. α γ Ald. Bk.

⁷ τῆς φωνῆς ἀκούσας transp. α γ edd.

⁸ β γ Ald.: μαχοῦμενος α edd.

⁹ codd. Ald. Sn.: ἀντάσσα coní. Bk. Dt.

ἀπὸ τῆς θηρευούσης. οὕτω δὲ σφόδρα καὶ οἱ πέρδικες καὶ οἱ ὄρνυγες ἐπτόνῃται περὶ τὴν ὀχείαν ὥστ' εἰς τοὺς θηρεύοντας ἐμπίπτουσι καὶ πολλάκις καθιζάνουσιν ἐπὶ τὰς κεφαλὰς. περὶ μὲν οὖν
 30 τὴν ὀχείαν καὶ θήραν τῶν περδίκων τοιαῦτα συμβαίνει καὶ περὶ τὴν ἄλλην τοῦ ἥθους πανουργίαν. νεοττεύουσι δ' ἐπὶ τῆς γῆς, ὥσπερ εἴρηται, οἱ τε ὄρνυγες καὶ οἱ πέρδικες καὶ τῶν ἄλλων ἔνιοι τῶν πτητικῶν. ἔτι δὲ τῶν τοιούτων ὁ μὲν κόρυδος καὶ ὁ σκολόπαξ καὶ ὄρνυξ ἐπὶ δένδρου οὐ καθίζουσιν ἀλλ' ἐπὶ τῆς γῆς.

IX ὁ δὲ δρυοκολάπτης οὐ καθίζει ἐπὶ τῆς γῆς.
 614b κόπτει δὲ τὰς δρυὺς τῶν σκωλήκων καὶ σκνιπῶν ἔνεκεν, ἵν' ἐξίωσιν. ἀναλέγεται γὰρ ἐξελθόντας αὐτοὺς τῇ γλώττῃ· πλατεῖαν δ' ἔχει καὶ μεγάλην. καὶ πορεύεται ἐπὶ τοῖς δένδρεσι πάντα τρόπον ταχέως,¹ καὶ ὕπτιος, καθάπερ οἱ ἀσκαλαβῶται. ἔχει δὲ καὶ τοὺς ὄνυχας βελτίους τῶν
 5 κολοιῶν πεφυκότας πρὸς τὴν ἀσφάλειαν τῆς ἐπὶ τοῖς δένδρεσιν ἐφεδρείας· τούτους γὰρ ἐμπηγνὺς πορεύεται. ἔστι δὲ τῶν δρυοκολαπτῶν ἓν μὲν

¹ ταχέως post δένδρεσι transp. a γ Bk.

^a Usually taken here to mean the hunting birds or decoys (614a10); but Pliny X 51. 102 and Gaza take it as

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to be trodden by him and to draw him away from the hunting female. So strongly are the partridges and the quails excited about mating that they throw themselves on to the hunters^a and often settle on their heads. Such then are the events connected with the mating and hunting of partridges and with their other characteristic tricks. Nests are made on the ground, as we have said,^b by the quails and partridges, and also by certain of the other birds that are given to flying. Moreover, among such birds the lark and woodcock and quail do not sit on a tree but on the ground.

The woodpecker does not sit on the ground. It IX
pecks at the trees for the grubs and sknipes,^c to make them come out. For after they have come out it collects them with its tongue; it has a broad and large one. And it walks fast on the trees in any position, even upside down, like the geckos. It has claws better fitted by nature than the jackdaws for security in perching on the trees, for it walks by fixing them in. Of the woodpeckers,^d one kind is smaller

the fowlers, which would also be the normal sense of Athen. IX 389E.

^b 613b8. ^cCf. VII(VIII) 593a3.

^d Contrast the different report of woodpeckers at VII(VIII) 593a5. Th. identifies the three kinds here as (1) the greater and lesser spotted woodpeckers, (2) the green woodpecker, (3) the great black woodpecker. Sundevall however thought that (1) and (2) were the spotted woodpeckers. It may be that Arist. omits the green woodpecker here since he does not call it a *δρυοκόλαπτης* but *κελεύς*.

γένος ἔλαττον τοῦ κοττύφου, ἔχει δ' ὑπέρυθρα
 μικρά, ἕτερον δὲ γένος μείζον ἢ κόττυφος. τὸ δὲ
 10 τρίτον γένος αὐτῶν οὐ πολλῶ ἔλαττόν ἐστιν
 ἀλεκτορίδος θηλείας. νεοττεύει δ' ἐπὶ τῶν δέν-
 δρων, ὥσπερ εἴρηται, ἐν ἄλλοις τε τῶν δένδρων
 καὶ ἐν ἐλαίαις. βόσκεται δὲ τοὺς τε μύρμηκας
 καὶ τοὺς σκώληκας τοὺς ἐκ τῶν δένδρων. θηρεύ-
 οντα δὲ τοὺς σκώληκας οὕτω σφόδρα φασὶ κοι-
 λαίνειν ὥστε καταβάλλειν τὰ δένδρα. καὶ τιθασ-
 15 σεύόμενος δὲ ἤδη τις¹ ἀμύγδαλον εἰς ῥωγμὴν
 ξύλου ἐνθεῖς, ὅπως ἐναρμοσθὲν ὑπομείνειεν αὐτοῦ
 τὴν πληγὴν, ἐν τῇ τρίτῃ πληγῇ διέκοψε καὶ
 κατήσθιε τὸ μαλακόν.

X φρόνιμα δὲ πολλὰ καὶ περὶ τὰς γεράνους δοκεῖ
 συμβαίνειν. ἐκτοπίζουσί τε γὰρ μακράν, καὶ εἰς
 20 ὕψος πέτονται πρὸς τὸ καθορᾶν τὰ πόρρω, καὶ
 ἐὰν ἴδωσι νέφη καὶ χειμέρια καταπτᾶσαι ἡσυχά-
 ζουσιν. ἔτι δὲ τὸ ἔχειν ἡγεμόνα τε καὶ τοὺς ἐπι-
 συρίττοντας ἐν τοῖς ἐσχάτοις ὥστε ἀκούεσθαι²
 τὴν φωνήν. ὅταν δὲ καθίζωνται, αἱ μὲν ἄλλαι
 ὑπὸ τῇ πτέρυγι τὴν κεφαλὴν ἔχουσιν καθεύδου-
 25 σιν ἐπὶ ἑνὸς ποδὸς ἐναλλάξ, ὁ δ' ἡγεμὼν γυμνὴν
 ἔχων τὴν κεφαλὴν προορᾷ, καὶ ὅταν αἰσθηταί τι
 σημαίνει βοῶν.

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than the blackbird, with small reddish markings, a second kind is larger than a blackbird, and the third kind is not much smaller than a domestic hen. It nests on the trees, as we have said,^a especially in olive trees among others. It feeds on the ants and grubs that come out of the trees. They say that in hunting for grubs it hollows out the trees so severely as to bring them down. And once one that was being tamed inserted an almond into a cleft in some wood, so that by fitting tight it should stay there while being struck: at the third blow he split it and ate up the soft part.

Many instances of intelligence seem to occur X among the cranes too. For they migrate a long way, and fly to a great height in order to survey the distance, and if they see clouds and bad weather they fly down and stay quiet. Further, the fact that they have both a leader and signallers that whistle among the end birds so that their call is heard. And when they settle, while the others sleep with their head under the wing, standing on one foot and then on the other, the leader with his head uncovered keeps a look-out, and whenever he perceives something he signals with a cry.

^a Not previously said, unless implied at 614a35.

¹ *τις ἡδὴ* transp. α γ Bk.

² *β* Ald.: *κατακούεσθαι α γ* Bk.

οἱ δὲ πελεκᾶνες οἱ ἐν τοῖς ποταμοῖς γινόμενοι
καταπίνουσι τὰς μεγάλας κόγχας καὶ λείας·
ὅταν δ' ἐν τῷ πρὸ τῆς κοιλίας τόπῳ πέψωσιν
30 ἐξεμοῦσιν, ἵνα χασκουσῶν τὰ κρέα ἐξαιροῦντες
ἐσθίωσιν.

XI τῶν δ' ἀγρίων ὀρνέων αἱ τ' οἰκήσεις μεμη-
χάνηται πρὸς τοὺς βίους καὶ τὰς σωτηρίας τῶν
τέκνων. εἰσὶ δ' οἱ μὲν εὐτεκνοὶ αὐτῶν καὶ ἐπι-
μελεῖς τῶν τέκνων οἱ δὲ τοῦναντίον, καὶ οἱ μὲν
εὐμήχανοι πρὸς τὸν βίον οἱ δ' ἀμηχανώτεροι.
35 τὰς δ' οἰκήσεις οἱ μὲν περὶ τὰς χαράδρας οἱ δὲ¹
615a χηραμοὺς ποιοῦνται καὶ πέτρας, οἷον ὁ καλούμε-
νος χαραδριός· ἔστι δ' ὁ χαραδριὸς καὶ τὴν χροάν
καὶ τὴν φωνήν φαῦλος, φαίνεται δὲ νύκτωρ,
ἡμέρας δ' ἀποδιδράσκει. ἐν ἀποτόμοις δὲ καὶ ὁ
ἰέραξ νεοττεύει. ὠμοφάγος δ' ὢν, ὢν ἂν κρα-
5 τήσῃ ὀρνέων τὴν καρδίαν οὐ κατεσθίει· καὶ τοῦτό
τινες ἐωράκασιν καὶ ἐπ' ὄρτυγος καὶ ἐπὶ κίχλης
καὶ ἕτεροι ἐφ' ἐτέρων. ἔτι δὲ καὶ περὶ τὸ θηρεύ-
ειν μεταβάλλουσιν· οὐ γὰρ ἀρπάζουσιν ὁμοίως
τοῦ θέρους. γυπὸς δὲ λέγεται ὑπὸ τινων ὥς οὐ-
δεὶς ἐώρακεν νεοττὸν ἢ νεοττείαν·² ἀλλὰ διὰ
10 τοῦτο ἔφη Ἡρόδωρος ὁ Βρύσωνος τοῦ σοφιστοῦ
πατὴρ ἀπὸ τινος αὐτὸν ἐτέρας εἶναι μετεώρου

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The pelicans that occur on the rivers swallow whole the large smooth mussels; and after concocting them in the region before the stomach they vomit them up so that while they are open they may extract the meat and eat it.

The wild birds' dwellings are devised both with a view to their ways of life and to the security of their young. Some of them are good parents and care for the young, others the reverse, and some are resourceful in providing a living, others less resourceful. Some make their dwellings around the gullies, others around hollows and rocks, for example the so-called charadrios; the charadrios is poor in both colouring and voice, and is seen at night but runs away in daytime. The hawk too nests in steep places. Though carnivorous, it does not eat the heart of any of the birds that it overcomes; this has been observed in the case of the quail and thrush, and in various cases by various observers. Also they change their actual way of hunting, for in the summer they do not seize prey in the same way. Of the vulture some say that nobody has seen nestling or nest; indeed because of this Herodorus the father of Bryson the sophist said that it comes from some

XI

¹ οἱ δὲ β L^ccorr. Ald.: καὶ α γ Cs. Bk.: aut Guil. (V): haec autem Guil. (F)

² ἑώρακεν . . . νεοττεῖαν β: ἑώρακεν οὐτε νε. οὐτε νε. α γ Ald. Bk.

γῆς, τεκμήριον τοῦτο λέγων καὶ τὸ φαίνεσθαι
 ταχὺ πολλούς, ὅθεν δὲ μηδενὶ εἶναι δῆλον. τού-
 του δ' αἰτιον ὅτι τίκτει ἐν πέτραις ἀπροσβάτοις·
 ἔστι δ' οὐδὲ πολλαχοῦ ἐπιχώριος ὁ ὄρνις. τίκτει
 15 δ' ἐν ὧν ἢ δύο τὰ πλεῖστα. ἐνιοι δὲ τῶν ὀρνί-
 θων ἐν τοῖς ὄρεσι καὶ τῇ ὕλῃ κατοικοῦσιν, οἷον
 ἔποψι καὶ βρίνθος.¹ οὗτος δ' ὁ ὄρνις εὐβίotos καὶ
 ᾠδικός. ὁ δὲ τροχίλος² λόχμας καὶ τρώγλας
 οἰκεῖ· δυσάλωτος δὲ καὶ δραπέτης καὶ τὸ ἦθος
 ἀσθενές, εὐβίotos δὲ καὶ τεχνικός. καλεῖται δὲ
 20 πρέσβυς καὶ βασιλεύς· διὸ καὶ τὸν αἰτὸν αὐτῷ
 φασὶ πολεμεῖν.

XII εἰσὶ δὲ τινες οἱ περὶ τὴν θάλατταν βιοῦσιν,
 οἷον κίγκλος. ἔστι δὲ τὸ ἦθος ὁ κίγκλος πανοῦρ-
 γος καὶ δυσθήρατος, ὅταν δὲ ληφθῇ τιθασσότα-
 τος. τυγχάνει δ' ὧν καὶ ἀνάπηρος· ἀκρατὴς
 γὰρ τῶν ὀπισθέν ἐστιν.

ζῶσι δὲ περὶ θάλατταν καὶ ποταμούς καὶ
 25 λίμνας οἱ μὲν στεγανόποδες ἅπαντες· ἡ γὰρ
 φύσις αὕτη³ ζητεῖ τὸ πρόσφορον· πολλοὶ δὲ καὶ
 τῶν σχιζοπόδων περὶ τὰ ὕδατα καὶ τὰ ἔλη βιοτεύ-
 ουσιν, οἷον ἄνθος παρὰ⁴ τοὺς ποταμούς· ἔχει

¹ G^a β P K^c M^c L^c rec. Ald.: βρένθος α E^a L^c pr. m n Bk.

² τροχίλος καὶ α γ Ald. Bk.

other high land, giving as evidence both this and the fact that many quickly appear and yet nobody can see from whence. But the cause of this is that it gives birth among inaccessible rocks; and the bird is not a resident in many places. It lays one egg, or two at most. Certain birds dwell on mountains and in woodland, for example hoopoe and brinthus; the latter bird lives well^a and is a songster. The trochilos^b inhabits thickets and holes; it is difficult to catch and fugitive and weak-charactered, but it lives well and is ingenious. It is called 'old man' and 'king'; and that is why, they say, the eagle is at war with it.

There are some that live by the sea, for example XII
kinklos. In character the kinklos has wicked tricks and is difficult to hunt, but when caught it is very tame. It is in fact also defective, for it cannot control its hinder parts.

Residents by sea and rivers and lakes include all the web-footed; for nature itself seeks what is suitable.^c Many of the split-footed birds too live by waters and marshes, for example anthos alongside

^a Cf. 609b19 note.

^b Here the wren, cf. 609b12 and 609a12 note on orchilos.

^c On the teleological implication see note at 591b27. Their own nature has equipped these birds for their water environment, and therefore they prefer water.

³ β γ (exc. L^c) Ald.: αὐτῆ C^a: om. Guil.

⁴ περὶ α (exc. C^a) L^cpr. Ald. Bk.

δὲ τὴν χροάν καλὴν καὶ ἔστιν εὐβίοτον. ὁ δὲ
 καταρράκτης ζῇ μὲν περὶ θάλατταν, ὅταν δὲ
 30 καθῇ αὐτὸν εἰς τὸ βαθὺ μένει χρόνον οὐκ ἐλάτ-
 τωνα ἢ ὅσον πλέθρον διέλθοι τις· ἔστι δ' ἔλαττον
 ἱέρακος τὸ ὄρνεον. καὶ οἱ κύκνοι δ' εἰσὶ μὲν τῶν
 στεγανοπόδων, καὶ βιοτεύουσι δὲ¹ περὶ λίμνας
 καὶ ἔλη, εὐβίοτοι δὲ καὶ εὐήθεις καὶ εὐτεκνοὶ καὶ
 615b εὐγῆροι· καὶ τὸν αἰτὸν ἐὰν ἄρξῃται ἀμυνόμενοι
 νικῶσιν, αὐτοὶ δ' οὐκ ἄρχουσι μάχης. ὠδικοὶ δέ,
 καὶ περὶ τὰς τελευτὰς μάλιστα ἄδουσιν· ἀναπέ-
 τονται γὰρ καὶ εἰς τὸ πέλαγος, καὶ τινες ἤδη
 πλέοντες παρὰ τὴν Λιβύην περιέτυχον ἐν τῇ θα-
 5 λάττῃ πολλοῖς ἄδουσι φωνῇ γοῶδει, καὶ τούτων
 ἑώρων ἀποθνήσκοντας ἐνίλους.

ἡ δὲ κύμινδις ὀλιγάκις μὲν φαίνεται (οἰκεῖ γὰρ
 ὄρη), ἔστι δὲ μέλας² καὶ μέγεθος ὅσον ἱέραξ ὁ
 φασσόφωνος³ καλούμενος, καὶ τὴν ιδέαν μακρὸς
 καὶ λεπτός. κύμινδιν δὲ καλοῦσιν Ἰωνες αὐτόν·⁴
 ἥς καὶ Ὅμηρος μέμνηται ἐν τῇ Ἰλιάδι εἰπὼν
 10 “χαλκίδα κικλήσκουσι θεοὶ ἄνδρες δὲ κύμινδιν”.
 ἡ δ' ὕβρις, φασὶ δὲ τινες εἶναι τὸν αὐτὸν τοῦτον
 ὄρνιθα τῷ πτυγγί, οὗτος ἡμέρας μὲν οὐ φαίνεται
 διὰ τὸ μὴ βλέπειν ὀξύ, τὰς δὲ νύκτας θηρεύει
 ὥσπερ οἱ αἰετοί· καὶ μάχονται δὲ πρὸς τὸν αἰτὸν

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rivers: its colouring is beautiful and it lives well. The katarraktes lives by the sea, and when it plunges in deep it stays for not less time than it would take a man to cover a plethron; the bird is smaller than a hawk. Further, swans are among the web-footed, and also spend their lives around lakes and marshes; they live well, and are good-natured, and are good parents, and age well; and if the eagle starts a fight they defend themselves and win, but they do not start a fight themselves. They are songsters and sing especially at the time of their death; for they fly even out to sea, and before now people sailing by Libya came upon them on the sea in large numbers singing with a mournful voice and saw some of them dying.

The kumindis is rarely seen (for it dwells on mountains); it is black, of the size of the hawk called the pigeon-killer, in shape long and narrow. Kumindis is what Ionians call it; it is the one that Homer mentions in the *Iliad*,^a saying "Gods call it chalkis, but men kumindis". And the hybris (some say this is the same bird as the ptynx)—this does not appear by day because it does not see sharply, but by night it hunts like the eagles; moreover they

^a Hom. *Il.* 14. 291; cf. Plat. *Cratyl.* 392A.

¹ om. α γ Ald. Bk.

² μέλαν α γ (exc. L^c) Bk.

³ β γ: φασσoφόνος α O^c T^c Bk.: φασσήφονος Ald.

⁴ αὐτήν L^c m Ald. Bk.

οὕτω σφόδρα ὥστ' ἄμφω λαμβάνεσθαι πολλάκις
 15 ζῶντας ὑπὸ τῶν νομέων. τίκτει μὲν οὖν δύο ᾠά,
 νεοττεύει δὲ καὶ οὗτος ἐν πέτραις καὶ σπηλαίοις.
 μάχιμοι δὲ καὶ αἱ γέρανοι εἰσι πρὸς ἀλλήλας
 οὕτω σφόδρα ὥστε καὶ λαμβάνεσθαι μαχομένας·
 ὑπομένουσι γάρ. τίκτει δὲ καὶ¹ γέρανος δύο ᾠά.

XIII ἡ δὲ κίττα φωνὰς μὲν μεταβάλλει πλείστας
 20 (καθ' ἑκάστην γὰρ ὥς εἰπεῖν ἡμέραν ἄλλην
 ἀφίησι), τίκτει δὲ περὶ ἑννέα ᾠά, ποιεῖται δὲ τὴν
 νεοττείαν ἐπὶ τῶν δένδρων ἐκ τριχῶν καὶ ἐρίων·
 ὅταν δ' ὑπολείπωσιν² αἱ βάλανοι ἀποκρύπτουσα
 ταμιεύεται. περὶ μὲν οὖν τῶν πελαργῶν, ὅτι
 ἀντεκτρέφονται θρυλεῖται παρὰ πολλοῖς· φασὶ δέ
 25 τινες καὶ τοὺς μέροπας ταὐτὸ τοῦτο ποιεῖν, καὶ
 ἀντεκτρέφεσθαι ὑπὸ τῶν ἐκγόνων οὐ μόνον γη-
 ράσκοντας ἀλλὰ καὶ εὐθὺς ὅταν οἰοί τ' ὦσιν· τὸν
 δὲ πατέρα καὶ τὴν μητέρα μένειν ἔνδον. ἡ δ'
 ἰδέα τοῦ ὄρνιθος τῶν πτερῶν ἐστὶ τὰ μὲν ὑπο-
 κάτω ὠχρόν, τὰ δὲ ἐπάνω ὥσπερ τῆς ἀλκυόνος
 30 κυάνεον, τὰ δ' ἐπ' ἄκρων τῶν πτερυγίων ἐρυ-
 θρά. τίκτει δὲ περὶ ἕξ ἢ ἑπτὰ ὑπὸ τὴν ὀπώραν,
 ἐν τοῖς κρημνοῖς τοῖς μαλακοῖς· εἰσδύεται δ'
 εἰσω καὶ τέτταρας πήχεις. ἡ δὲ καλουμένη χλω-
 ρὶς διὰ τὸ τὰ κάτω ἔχειν ὠχρά, ἔστι μὲν ἡλίκον

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fight against the eagle so strongly that both are often caught alive by the shepherds. Now it lays two eggs, and it too nests in rocks and caves. Cranes too are given to fighting against each other so strongly that they are even caught while fighting, for they keep on at it. The crane too lays two eggs.

The jay has the greatest variety of voices (for it utters a different one practically every day); it lays about nine eggs, and makes its nest on the trees out of hairs and wool; when the acorns are getting scarce it makes a hidden store of them. Now it is commonly reported of the storks that they are fed in return by their young; but some say that the bee-eaters too do the same thing, and that they are fed in return by their offspring not only in old age but straightaway too when the young are able to, and the father and mother stay inside. The appearance of the bird's feathers is a yellow in the under parts and a dark blue like the halcyon's in the upper parts, while at the wing tips they are red. It lays about six or seven eggs at the approach of the fruit season, in steep banks that are soft: it burrows in as far as four cubits. The bird called greenfinch (because its underparts are yellow) is the size of a

XIII

¹ om. α γ Bk.

² β n: ὑπολείπωσι cett. edd.: *diminuuntur* Scot.: *cedunt* Alb.: *defecerint* Guil.: *deficient* Trap. Gaza

- 616a κόρυδος, τίκτει δ' ὡὰ τέτταρα ἢ πέντε, τὴν δὲ
 νεοττεῖαν ποιεῖται μὲν ἐκ τοῦ συμφύτου ἔλκουσα
 πρόρριζον,¹ στρώματα δ' ὑποβάλλει τρίχας καὶ
 ἔρια. ταῦτά δὲ τούτῳ² ποιεῖ καὶ ὁ κόττυφος καὶ
 ἡ κίττα, καὶ τὰ ἐντὸς τῆς νεοττείας ἐκ τούτων
 5 ποιοῦνται. τεχνικῶς δὲ καὶ ἡ τῆς ἀκανθυλίδος³
 ἔχει νεοττεία· πέπλεκται γὰρ ὥσπερ σφαῖρα
 λινῇ, ἔχουσα τὴν εἰσδυσιν μικράν. φασὶ δὲ καὶ
 τὸ κινάμωμον⁴ ὄρνεον εἶναι οἱ ἐκ τῶν τόπων
 ἐκείνων, καὶ τὸ καλούμενον κινάμωμον⁵ φέρειν
 ποθὲν τοῦτο τὸ ὄρνεον καὶ τὴν νεοττεῖαν ἐξ
 αὐτοῦ ποιεῖσθαι. νεοττεύει δ' ἐφ' ὑψηλῶν δέν-
 10 δρων καὶ ἐν τοῖς θαλλοῖς τῶν δένδρων· ἀλλὰ
 τοὺς ἐγχωρίους μόλιβδον⁶ πρὸς τοῖς οἴστοις προσ-
 αρτῶντας τοξεύοντας καταβάλλειν, καὶ οὕτω
 συνάγειν ἐκ τοῦ φορυτοῦ τὸ κινάμωμον.⁷
- XIV ἡ δ' ἀλκυὼν⁸ ἔστι μὲν οὐ πολλῷ μείζων στρου-
 15 θοῦ, τὸ δὲ χρῶμα καὶ κυανοῦν ἔχει καὶ χλωρὸν
 καὶ ὑποπόρφυρον· μεμιγμένως δὲ τοιοῦτον τὸ
 σῶμα πᾶν καὶ αἱ πτέρυγες καὶ τὰ περὶ τὸν τρά-
 χηλον, οὐ χωρὶς ἕκαστον τῶν χρωμάτων· τὸ δὲ
 ῥύγχος ὑπόχλωρον μὲν, μακρὸν δὲ καὶ λεπτόν.
 τὸ μὲν οὖν εἶδος ἔχει τοιοῦτον, ἡ δὲ νεοττεία

¹ πρόριζον C^a: ἀπρόριζον γ (exc. L^grec.): πρόσριζον Ald. Bk.

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lark, and lays four or five eggs; it makes its nest out of comfrey,^a pulling it up by the roots, and lays down bedding of hairs and wool. Both the blackbird and the jay do the same and make the inside of the nest of these materials. There is ingenuity too in the nest of *acanthylis*: it is twined like a ball of flax with an entry that is small. The cinnamon is also said to be a bird by the people from those regions; they say that what we call cinnamon is brought by this bird from somewhere and is made into its nest. It nests on high trees and on the new shoots of the trees; but they say the natives fix lead on their arrows and by shooting bring down the nests and so collect the cinnamon from the debris.

The halcyon^b is not much bigger than a sparrow. XIV
Its colouring combines dark blue and green and purplish: the whole body and the wings and the neck parts have such colours mingled, not each colour separate; the beak is greenish, long and narrow. Such then is its appearance; and its nest is very like

^a *Symphytum bulbosum*, a medicinal plant described by Diosc. IV 10 as having soft downy stem and leaves.

^b Described like the kingfisher, but with mythical additions; cf. V 542b4 and see Th. G.G.B. s.v.

² ταῦτα δὲ τούτω β: ταὐτὸ δὲ τοῦτο α γ Ald. Bk.

³ β E^a L^c n Ald.: ἀκανθιλλιδνος C^a: ἀκανθυλλιδος P K^c M^c edd. ⁴ κινν- C^a R^c rec. Guil. Gaza edd.

⁵ β L^c rec. Ald.: κινν- cett. edd.

⁶ μόλυβδον L^c n Ald. edd. ⁷ α β γ Ald.: κινν- C^a A^a edd.

⁸ ἄλκυων nonn. Bk. (ut semper)

20 παρομοία ταῖς σφαίραις ταῖς θαλαττίαις ἐστὶ καὶ
 ταῖς καλουμέναις ἁλοσάχναις πλὴν τοῦ χρώμα-
 τος· τὴν δὲ χροάν ὑπόπυρρον ἔχουσιν, τὸ δὲ
 σχῆμα παραπλήσιον ταῖς σικύαις ταῖς ἐχούσαις
 τοὺς τραχήλους μακροὺς. τὸ δὲ μέγεθος αὐτῶν
 ἐστὶ τῆς μεγίστης σπογγιᾶς μεῖζον· εἰσὶ γὰρ
 25 καὶ μεῖζους καὶ ἐλάττους· κατάστεγοι δέ, καὶ
 τὸ στερεὸν ἔχουσι συχνὸν καὶ τὸ κοῖλον. καὶ
 κόπτοντι μὲν σιδηρίῳ ὀξεῖ οὐ ταχὺ διακόπτεται,
 ἅμα δὲ κόπτοντι καὶ ταῖς χερσὶ θραύονται ταχὺ
 διαθραύεται ὥσπερ ἡ ἁλοσάχνη. τὸ δὲ στόμα
 στενὸν ὅσον εἰσδυσιν μικράν, ὥστ' οὐδ' ἂν ἀνα-
 30 τραπῇ ἡ θάλαττα οὐκ εἰσέρχεται. τὰ δὲ κοῖλα
 παραπλήσια ἔχει τοῖς τῶν σπόγγων. ἀπορεῖται
 δ' ἐκ τίνος συντίθῃσι τὴν νεοττεῖαν, δοκεῖ δὲ
 μάλιστα ἐκ τῶν ἀκανθῶν τῆς βελόνης· ζῇ γὰρ
 ἰχθυοφαγοῦσα. ἀναβαίνει δὲ καὶ ἐπὶ¹ τοὺς ποτα-
 μούς. τίκτει δὲ περὶ πέντε μάλιστα ὥα. λοχεύ-
 εται δὲ διὰ βίου, ἄρχεται δὲ τετράμηνος.

XV ὁ δ' ἔποψ τὴν νεοττεῖαν μάλιστα ποιεῖται ἐκ
 616b τῆς ἀνθρωπίνης κόπρου. τὴν δ' ἰδέαν μεταβάλ-
 λει τοῦ θέρους καὶ τοῦ χειμῶνος, ὥσπερ καὶ τῶν
 ἄλλων ἀγρίων τὰ πλεῖστα. ὁ δ' αἰγίθαλος τίκτει
 μὲν ὥα πλεῖστα, ὥς φασίν. ἔνιοι δὲ καὶ τὸν

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the sea balls, namely the so-called sea-foam, except its colouring: the colour of the nests is reddish, and their shape is like the gourds whose necks are long. Their size is bigger than the biggest sponge; for there are both bigger and smaller ones. They are roofed, and both the solid part and the hollow part are extensive. And it is not quickly cut through even by cutting with a sharp knife, but if one cuts at the same time as crushing with one's hands it quickly shatters like the sea-foam. Its mouth is narrow, enough for a small entrance, so that even if the sea is turned up^a it does not come in. The hollow parts are like those of sponges. It is a problem what she makes the nest of: it is thought to be mostly out of the bones of the belone; for she lives by eating fish. She goes up the rivers too. She lays mostly about five eggs. She gives birth throughout life, beginning when four months old.

The hoopoe mostly makes its nest out of human XV
dung. It changes its appearance^b in summer and winter, like most of the other wild birds too. The titmouse lays the most eggs, so they say. But certain

^a Lit. overturned, i.e. violently stirred; cf. VII(VIII) 600a4, also of the sea.

^b Cf. 633a17.

¹ *g* L^{rec}. Ald.: ἀνὰ α γ Bk.

μελαγκόρυφον καλούμενόν φασι πλείστα τίκτειν

- 5 μετά γε τὸν ἐν Λιβύῃ στρουθόν· ἐώραται μὲν
 γὰρ καὶ ἑπτακαίδεκα, τίκτει μέντοι καὶ πλείω ἢ
 εἴκοσιν. τίκτει δ' αἰὲς περιττά, ὥς φασίν. νεοτ-
 τεύει δὲ καὶ οὗτος ἐν τοῖς δένδρεσι, καὶ βόσκεται
 τοὺς σκώληκας. ἴδιον δὲ τοῦτο¹ καὶ ἀηδόνι παρὰ
 τοὺς ἄλλους ὄρνιθας τὸ μὴ ἔχειν τῆς γλώττης τὸ
 10 ὀξύ. ὁ δ' αἰγίοθος² εὐβίotos καὶ πολύτεκνος, τὸν
 δὲ πόδα χωλός ἐστιν. χλωρίων δὲ μαθεῖν μὲν
 ἀγαθὸς καὶ βιομήχανος, κακοπέτης δὲ καὶ χροᾶν
 ἔχει μοχθηράν.

- XVI ἡ δ' ἐλέα ὥσπερ ἄλλος τις τῶν ὀρνίθων εὐ-
 βίotos, καὶ καθίζει θέρους μὲν ἐν προσηνέμῳ καὶ
 15 σκιᾷ, χειμῶνος δ' ἐν εὐηλίῳ καὶ ἐπισκεπεῖ ἐπὶ
 τῶν δονάκων περὶ τὰ ἔλη. ἔστι δὲ τὸ μὲν μέγε-
 θος βραχύς, φωνὴν δ' ἔχει ἀγαθὴν. καὶ ὁ γνά-
 φαλος καλούμενος τὴν τε φωνὴν ἔχει ἀγαθὴν καὶ
 τὸ χρῶμα καλὸς καὶ βιομήχανος καὶ τὸ εἶδος εὐ-
 πρεπής. δοκεῖ δ' εἶναι ξενικὸς ὄρνις· ὀλιγάκις
 γὰρ φαίνεται ἐν τοῖς μὴ οἰκείοις τόποις.

- XVII ἡ δὲ κρέξ τὸ μὲν ἦθος μάχιμος, τὴν δὲ διά-
 21 νοιαν εὐμήχανος πρὸς τὸν βίον, ἄλλως δὲ κακό-
 ποτμος ὄρνις. ἡ δὲ καλουμένη σίππη³ τὸ μὲν

¹ α β L^c Ald.: τούτω G^a rec. Q E^a P K^c M^c n Guil. Trap. Bk.

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people say that actually the so-called black-cap lays most, that is after the Libyan sparrow^a; seventeen eggs have been seen, but it even lays more than twenty. And it always lays an odd number, so they say. This bird too nests in the trees, and it feeds on grubs. A peculiarity of this bird and of the nightingale in comparison with the other birds is that these do not have the sharp point of the tongue. The aigiothos lives well and has many young, but is lame in the foot. The oriole is good at learning and resourceful in getting its living, but is a poor flyer and its colour is ugly.

The elea lives as well as any other bird, and sits in summer where there is breeze and shade, but in winter in a sunny and sheltered place on the reeds round the marshes. In size it is short, and its voice is good. The so-called gnaphalos too has a good voice and is beautiful in colouring and resourceful in way of life and graceful in form. It is thought to be a foreign bird; for it rarely appears in places other than its own.

XVI

The krex is pugnacious in character, in intelligence it is resourceful in getting a living, but otherwise an unlucky bird.^b And the so-called sippe is

XVII

^a That is, the ostrich; cf. PA IV 697b14.

^b Krex: possibly corn-crake, *Rallus crex* L., or black-winged stilt, *Himantopus rufipes*. "Unlucky" means both suffering and bringing ill luck. Cf. 609b11 and Th. G.G.B.

² β E^a P K^c M^c L^c rec. Ald.: αἰγίθος α Bk.: αἰγίθαλος L^c pr. n

³ β L^c rec. Ald.: αἰττη α γ Bk.

ἦθος μάχιμος, τὴν δὲ διάνοιαν εὐθικτος καὶ
 εὐθήμων καὶ εὐβίος, καὶ λέγεται φαρμάκεια
 εἶναι διὰ τὸ πολύιδρις εἶναι· πολύγονος δὲ καὶ
 25 εὐτεκνος, καὶ ζῆ ὑλοκοποῦσα. αἰγωλιὸς δ' ἔστι
 νυκτινόμος καὶ ἡμέρας ὀλιγάκις φαίνεται, καὶ
 οἰκεῖ καὶ οὗτος πέτρας καὶ σπήλυγγας· ἔστι γὰρ
 δίθαλλος, τὴν δὲ διάνοιαν βιωτικὸς καὶ εὐμήχα-
 νος. ἔστι δέ τι ὀρνίθιον μικρὸν ὃ καλεῖται κέρ-
 θιος· οὗτος τὸ μὲν ἦθος θρασύς, καὶ οἰκεῖ περὶ
 30 δένδρα, καὶ ἔστι θριποφάγος, τὴν δὲ διάνοιαν εὐ-
 βίος, καὶ τὴν φωνὴν ἔχει λαμπράν. αἱ δ'
 ἀκανθίδες κακόβιοι καὶ κακόχροι, φωνὴν μέντοι
 λιγυράν ἔχουσιν.

XVIII τῶν δ' ἐρωδιῶν ὁ μὲν πέλλος, ὥσπερ εἴρηται,
 ὀχεύει μὲν χαλεπῶς, εὐμήχανος δὲ καὶ δειπνοφό-
 35 ρος καὶ ἔπαγρος, ἐργάζεται δὲ τὴν ἡμέραν· τὴν
 617a μέντοι χροῖαν¹ ἔχει φαύλην καὶ τὴν κοιλίαν αἰεὶ
 ὑγράν. τῶν δὲ λοιπῶν δύο (τρία γὰρ γένη ἐστὶν
 αὐτῶν) ὁ μὲν λευκὸς τὴν τε χροῖαν ἔχει καλὴν,
 καὶ ὀχεύει ἁσινῶς, καὶ νεοττεύει καὶ τίκτει
 καλῶς ἐπὶ τῶν δένδρων, νέμεται δ' ἔλη καὶ
 5 λίμνας καὶ πεδία καὶ λειμῶνας. ὁ δ' ἄστεριος ὁ
 ἐπικαλούμενος ὄκνος μυθολογεῖται μὲν γενέσθαι

¹ χροῖαν a Bk.

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pugnacious in character while in intelligence it is adroit and orderly and lives well, and is said to be a witch because it is very knowing; it is prolific and is a good parent, and lives by pecking wood. Aigolios feeds at night and rarely appears by day; and this bird also dwells in rocks and caves, for it thrives in two ways, and in intelligence it is good at finding a living and is resourceful. And there is a certain little bird called kerthios; in character this bird is bold, and dwells among trees, and feeds on woodworms; as to intelligence, it lives well; its voice is clear. The akanthis lives poorly and has poor colouring, but its voice is tuneful.

Among the herons the grey one, as we have said,^a mates with difficulty, but it is resourceful and brings meals home and looks for prey, and it works by day; however its colour is poor and its stomach is always wet.^b Of the remaining two (for there are three kinds of them) the white one's colour is beautiful and it mates without harm and nests and gives birth successfully on the trees, and feeds in the marshes and lakes and plains and meadows. The starred heron, the one nicknamed faintheart, is supposed in the legend to have been born of slaves in

XVIII

^a 609b23.

^b Cf. 632b11, PA III 674b33. "Wet stomach" does not itself mean "loose bowels", but it may result in an excess of wet residue which can harm the stomach (PA III 670b5).

ἐκ δούλων τὸ ἀρχαῖον, ἔστι δὲ κατὰ τὴν ἐπωνυ-
 μίαν τούτων ἀργότατος. οἱ μὲν οὖν ἐρωδιοὶ τοῦ-
 τον τὸν τρόπον βιοῦσιν.¹ ἡ δὲ καλουμένη φῶνξ
 ἴδιον ἔχει πρὸς τᾶλλα· μάλιστα γάρ ἐστι ὀφθαλ-
 10 μοβόρος τῶν ὀρνίθων. πολέμιος δὲ τῇ ἄρπῃ· καὶ
 γὰρ ἐκείνη ὁμοιοβίωτος.

XIX τῶν δὲ κοττύφων δύο γένη ἐστίν, ὁ μὲν ἕτερος
 μέλας τε² καὶ πανταχοῦ ὤν, ὁ δ' ἕτερος ἔκλευ-
 κος, τὸ δὲ μέγεθος ἴσος ἐκείνῳ καὶ ἡ φωνὴ παρα-
 πλησία ἐκείνῳ· ἔστι δ' οὗτος ἐν Κυλλήνῃ τῆς
 15 Ἀρκαδίας, ἄλλοθι δ' οὐδαμοῦ. τούτων ὅμοιος τῷ
 μέλανι κοττύφῳ ἐστὶ βαιός,³ τὸ δὲ⁴ μέγεθος
 μικρῷ ἐλάττων· οὗτος ἐπὶ τῶν πετρῶν καὶ ἐπὶ
 τῶν κεράμων τὰς διατριβάς ποιεῖται, τὸ δὲ
 ῥύγχος οὐ φοινικοῦν ἔχει καθάπερ ὁ κόττυφος.

XX κιχλῶν δ' εἶδη τρία, ἡ μὲν ἱσοβόρος· αὕτη δ'
 οὐκ ἐσθίει ἀλλ' ἢ ἱξὸν καὶ ῥητίνην, τὸ δὲ μέγεθος
 20 ὅσον κίττα ἐστίν. ἑτέρα τριχάς· αὕτη δ' ὀξὺ
 φθέγγεται, τὸ δὲ μέγεθος ὅσον κόττυφος. ἄλλη
 δ' ἦν καλοῦσί τινες ἱλιάδα, ἐλαχίστη τε τούτων
 καὶ ἥττον ποικίλη.

XXI ἔστι δέ τις πετραῖος ὧ ὄνομα κύανος· οὗτος
 ὁ ὄρνις ἐν Σκύρῳ⁵ μάλιστα ἐστὶ, ποιεῖται δ'
 25 ἐπὶ τῶν πετρῶν τὰς διατριβάς. τὸ δὲ μέγεθος

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ancient times and in accordance with its nickname is the idlest of them. This then is the herons' way of life. The so-called phoyx has a peculiarity compared with the other birds: it is the most given to eating its prey's eyes. It is at war with the harpe, for that has a similar way of life.

Of the blackbirds there are two kinds, one black and occurring everywhere, the other all white but equal in size to the former and its voice nearly the same; the latter exists on Mt. Cyllene in Arcadia but nowhere else. Similar to the black blackbird is baios, but in size a little less; this spends its time on the rocks and on the roof-tiles, and its beak is not red like the blackbird's. XIX

Of thrushes there are three forms. One is the missel-thrush; this eats nothing but mistletoe and resin, and its size is that of a jay. Second, trichas; this has a sharp note, and its size is that of a blackbird. And another, which some call ilias, is the smallest of these and less variegated. XX

There is a rock bird named 'blue'; this occurs mostly in Skyros and spends its time on the rocks. XXI

¹ βιοῦσι τὸν τρόπον transp. α (exc. C^a) Bk.

² om. α γ Ald. Bk.

³ β γ Ald.: λαιός α edd.: φαίος O^crec.: *avis quae dicitur leneo* Scot.: *fuscus laius* Guil. (V): *fuscus* Guil. (F): *celeus* Trap.: *fusca* Gaza ⁴ om. α γ (exc. L^crec.) Bk.

⁵ ἐν σκύρῳ β L^crec. Ald.: ἐν νισύρῳ A^a F^a X^c Bk.: ἐνὶ σύρῳ A^a G^a Q

κοττύφου μὲν ἔλαττον¹ σπίζης δὲ μείζον² μικρῷ.
 μεγαλόπους δὲ καὶ πρὸς τὰς πέτρας προσαναβαί-
 νει. κυανοῦς ὅλος· τὸ δὲ ῥύγχος ἔχει λεπτόν καὶ
 μακρόν, σκέλη δὲ βραχέα τῇ ἰῖππῳ³ παρόμοια.

- XXII ὁ δὲ χλωρίων χλωρὸς ὅλος· οὗτος τὸν χειμῶνα
 30 οὐχ ὁράται, περὶ δὲ τὰς τροπὰς τὰς θερινὰς
 φανερὸς μάλιστα γίνεται, ἀπαλλάττεται δ' ὅταν
 Ἀρκτοῦρος ἐπιτέλλῃ. τὸ δὲ μέγεθος ἐστὶν ὅσον
 τρυγῶν. ὁ δὲ μαλακοκρανεὺς αἰεὶ ἐπὶ τὸ αὐτὸ
 617b καθιζάνει, καὶ ἀλίσκεται ἐνταῦθα. τὸ δὲ εἶδος,
 κεφαλὴ μὲν μεγάλη χονδρότυπος, τὸ δὲ μέγεθος
 ἔλαττον⁴ κίχλης μικρῷ· στόμα δ' εὖρωστον μικρὸν
 στρογγύλον· τὸ δὲ χρῶμα σποδοειδὲς ὅλος·
 5 εὖπους δὲ καὶ κακόπτερος. ἀλίσκεται δὲ μάλιστα
 γλαυκί.

- XXIII ἔστι δὲ καὶ ὁ⁵ πάρδαλος. τοῦτο δὲ τὸ ὄρνεόν
 ἐστὶν ἀγελαῖον ὥς ἐπὶ τὸ πολὺ καὶ οὐκ ἔστι κατὰ
 ἓνα ἰδεῖν· τὸ δὲ χρῶμα σποδοειδὲς ὅλος, μέγεθος
 δὲ παραπλήσιον⁶ ἐκείνοις, εὖπους δὲ καὶ οὐ
 κακόπτερος, φωνὴ δὲ πολλή καὶ οὐ βαρεῖα. κολ-
 10 λυρίων δὲ τὰ αὐτὰ ἐσθίει τῷ κοττύφῳ· τὸ δὲ
 μέγεθος καὶ τούτου ταῦτόν τοις προτέροις·⁷ ἀλί-

¹ ἐλάττων L^c Ald. Bk.

² μεῖζων E^a L^c Ald. Bk.: μεῖζω n

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Its size is less than a blackbird but a little bigger than a chaffinch. It has large feet and climbs up the face of the rocks. It is blue all over; its beak is narrow and long and its legs are short and very like the †horse's†.^a

The oriole is yellow all over; this bird is not seen in the winter but usually becomes evident about the summer solstice and departs when Arcturus is rising. Its size is that of a turtle-dove. The 'softhead' always settles on the same spot and is caught there. As to its form, the head is large and cartilaginous and the bird is a little smaller than a thrush; mouth strong, small, round; in colour it is ashen all over; it is good on its feet but bad on the wing. It is caught mostly by means of an owl. XXII

There is also the pardalos. This bird is gregarious as a rule and is not to be seen singly. In colour it is ashen all over, its size close to those just mentioned; it is good on its feet and not bad on the wing; its voice is full and not low pitched. Collyrion eats the same things as the blackbird; its size too is the same as those mentioned before it. It is caught XXIII

^a [Cf. Th. G.G.B. s.v. ἵππη, πιπώ, and 609a30.]

³ ἵππη† β γ Ald.: ἵπποις† α: πίπω G^arec. Guil. Trap. Gaza edd.: ἵπιπω Q Ott.: kiko Scot. Alb.

⁴ ἐλάττων L^c n Ald. Guil. Gaza edd.

⁵ om. α γ (exc. L^crec.) Bk.

⁶ παραπλήσιος E^a L^c n Ald. edd.: similis Guil.

⁷ β: πρότερον α γ Ald. Bk.

σκεται δὲ κατὰ χειμῶνα μάλιστα. ταῦτα δὲ πάντα οὐ διὰ παντὸς¹ φανερά ἐστιν. ἔτι δὲ τὰ κατὰ πόλεις εἰωθότα μάλιστα ζῆν, κόραξ καὶ κορώνη· καὶ γὰρ ταῦτ' αἰὲ φανερά καὶ οὐ μετα-
 15 βάλλει τοὺς τόπους οὐδὲ φωλεύει.

XXIV κολοιῶν δ' ἐστὶν εἶδη τρία. ἓν μὲν ὁ κορα-
 κίας· οὗτος ὅσον κορώνη, φοινικόρυγχος· ἄλλος ὁ
 λύκος καλούμενος· ἔτι δ' ὁ μικρός, ὁ βωμολόχος.
 ἔτι² δὲ καὶ ἄλλο τι³ γένος κολοιῶν περὶ τὴν Λυ-
 διάν καὶ Φρυγίαν ὃ στεγανόπουν ἐστίν.

XXV κορυδαλῶν δ' ἐστὶ δύο γένη, ἡ μὲν ἑτέρα ἐπί-
 21 γειος καὶ λόφον ἔχουσα, ἡ δ' ἑτέρα ἀγελαία καὶ
 οὐ σποράς ὥσπερ ἐκείνη, τὸ μέντοι χρῶμα ὅμοιον
 τῇ ἑτέρᾳ ἔχουσα, τὸ δὲ μέγεθος ἑλαττον καὶ
 λόφον οὐκ ἔχει· ἐσθίεται δέ.

XXVI ἀσκαλώπας δ' ἐν τοῖς κήποις ἀλίσκεται
 25 ἔρκεσιν· τὸ μέγεθος ὅσον ἀλεκτορίς, τὸ ῥύγχος
 μακρόν, τὸ χρῶμα ὅμοιον ἀτταγῆνι· τρέχει δὲ
 ταχύ, καὶ φιλάνθρωπόν ἐστιν ἐπιεικῶς. ὁ δὲ
 ψάρος ἐστὶ ποικίλος· μέγεθος δ' ἐστὶν ἡλίκον
 κόττυφος.

XXVII αἰ δ' ἱβίες αἰ ἐν Αἰγύπτῳ εἰσὶ μὲν διτταί, αἰ

¹ ταῦτα ... παντὸς β L^{rec.} Ald. Dt.: ταῦτα δὲ πάντα διὰ παντος α γ Cs. Bk.: ταῦτα πάντα· οὐ γὰρ διὰ παντὸς G^arec.:

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mostly in winter conditions. All these birds are not evident at all times. And further, the birds that in fact are accustomed to live mostly in cities, raven and crow: these are always evident and do not change their place nor hide.

Of jackdaws there are three forms. One, the XXIV
chough: this is the size of a crow, with a red beak. Another, the so-called wolf; and further, the small one, the 'joker'. And also yet another kind of jackdaws around Lydia and Phrygia, which is web-footed.^a

Of larks there are two kinds. One lives on the XXV
ground and has a crest. The other is gregarious and not sporadic like the former; its colouring is like the other's but its size is less and it does not have a crest; it is eaten.

Woodcock is caught in the gardens by nets; its XXVI
size is that of a domestic hen, the beak is long, the colouring like a francolin. It runs fast, and is moderately friendly to man. The starling is variegated and is the size of a blackbird.

The ibises in Egypt are divided into two, the XXVII

^a Probably the little cormorant, according to Th., who compares the large cormorant called raven at VII(VIII) 593b18.

haec omnia, non enim semper manifesta Guil.: *non enim semper apparent* Trap.: *haec omnia semper apparent* Gaza

² β L^c Ald.: εστι α γ Bk.

³ ἄλλο τι β: ἄλλο α γ Bk.: ἀλλότι δὲ Ald.

30 μὲν λευκαὶ αὐτῶν αἱ δὲ μέλαιναι. ἐν μὲν οὖν τῇ
 ἄλλῃ Αἰγύπτῳ αἱ λευκαὶ εἰσι, πλὴν ἐν Πηλουσίῳ
 οὐ γίνονται· αἱ δὲ μέλαιναι ἐν τῇ ἄλλῃ Αἰγύπτῳ
 οὐκ εἰσίν, ἐν Πηλουσίῳ δ' εἰσίν.

XXVIII σκῶπες δ' οἱ μὲν ἀεὶ πᾶσαν ὥραν εἰσί, καὶ
 618a καλοῦνται ἀεὶ σκῶπες,¹ καὶ οὐκ ἐσθίονται διὰ τὸ
 ἄβρωτοι εἶναι· ἕτεροι δὲ γίνονται ἐνίοτε τοῦ
 φθινοπώρου, φαίνονται δ' ἐφ' ἡμέραν μίαν ἢ δύο
 τὸ πλεῖστον, καὶ εἰσίν ἐδώδιμοι καὶ σφόδρα
 εὐδοκιμοῦσιν. καὶ διαφέρουσι τῶν ἀεὶ σκωπῶν²
 5 καλουμένων οὔτοι ἄλλῳ μὲν ὥς εἰπεῖν οὐδενὶ τῷ
 δὲ πάχει· καὶ οὔτοι μὲν εἰσιν ἄφωνοι ἐκεῖνοι δὲ
 φθέγγονται. περὶ δὲ γενέσεως αὐτῶν ἥτις ἐστὶν
 οὐθὲν ὥπται πλὴν ὅτι τοῖς ζεφυρίοις φαίνονται·
 τοῦτο δὲ φανερόν.

XXIX ὁ δὲ κόκκυξ, ὥσπερ εἴρηται ἐν ἑτέροις, οὐ
 ποιεῖ νεοττεῖαν ἀλλ' ἐν ἀλλοτρίαις τίκτει νεοτ-
 10 τεύαις, μάλιστα μὲν ἐν ταῖς τῶν φαβῶν καὶ ἐν
 ὑπολαίδος καὶ κορύδου χαμαί, ἐπὶ δένδρου δ' ἐπὶ³
 τῇ τῆς χλωρίδος καλουμένης νεοττεῖᾳ. τίκτει
 μὲν οὖν ἐν ὥόν, ἐπωάζει δ' οὐκ αὐτός, ἀλλ' ἐν οὗ
 ἂν τέκῃ νεοττεῖᾳ οὗτος ὁ ὄρνις ἐκκολάπτει καὶ
 τρέφει, καὶ (ὥς φασίν) ὅταν αὐξάνηται ὁ τοῦ
 15 κόκκυγος νεοττὸς ἐκβάλλει τὰ αὐτῆς⁴ καὶ ἀπόλ-

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white and the black.^a Now the white occur in the rest of Egypt except in Pelusium, while the black are not in the rest of Egypt but are in Pelusium.

Of scops, some are always present at every season and are called 'ever-scops'; they are not eaten because they are inedible. The others occur sometimes in autumn and appear for one day or two at most; they are eatable and are thought very well of. These differ from the so-called ever-scops in practically no other respect but in fatness. And these are voiceless while the former have a call. Of the nature of their generation nothing has been observed except that they appear in the west winds: that is evident.

XXVIII

The cuckoo, as we have said elsewhere, does not make a nest but lays in other birds' nests, mostly in those of the wood pigeons and of hypolais and of lark on the ground, and on a tree in the nest of the so-called greenfinch. Now it lays one egg but does not itself sit on it, but the bird in whose nest it has been laid hatches it and rears it; and (so they say) when the cuckoo chick grows big it throws out her young,

XXIX

^a Cf. Hdt. II 76. Pelusium (Teeneh) is on the coast at the most easterly mouth of the Nile.

¹ δεισκῶνες edd.

² δεισκωπῶν C^a edd.

³ ἐν α γ (exc. L^c rec.) Ald. Bk.

⁴ αὐτῆς L^c edd.

- λυνται οὕτως. οἱ δὲ λέγουσιν ὥς καὶ ἀποκτείνασα ἢ τρέφουσα δίδωσι καταφαγεῖν· διὰ γὰρ τὸ καλὸν εἶναι τὸν τοῦ κόκκυγος νεοττὸν ἀποδοκιμάζει τὰ αὐτῆς. τὰ μὲν οὖν πλεῖστα τούτων ὁμολογοῦσιν αὐτόπται γεγεννημένοι τινές· περὶ δὲ τῆς φθορᾶς τῆς τῶν νεοττῶν τῆς ὀρνιθος οὐχ
- 20 ὡσαύτως πάντες λέγουσιν, ἀλλ' οἱ μὲν φασιν αὐτὸν ἐπιφοιτῶντα τὸν κόκκυγα κατεσθίειν τὰ τῆς ὑποδεξαμένης ὀρνιθος νεόττια, οἱ δὲ διὰ τὸ τῷ μεγέθει ὑπερέχειν τὸν νεοττὸν τοῦ κόκκυγος ὑποκάπτοντα τὰ προσφερόμενα φθάνειν, ὥστε λιμῷ τοὺς ἑτέρους ἀπόλλυσθαι νεοττούς, οἱ
- 25 δὲ κρείττω ὄντα ἀποκτινύναι συντρεφόμενον αὐτοῖς. δοκεῖ δ' ὁ κόκκυξ φρόνιμον ποιεῖσθαι τὴν τέκνωσιν· διὰ γὰρ τὸ συνειδέναι αὐτῷ τὴν δειλίαν καὶ ὅτι οὐκ ἂν δύναίτο βοηθῆσαι, διὰ τοῦτο ὥσπερ ὑποβολιμαίους ποιεῖ τοὺς ἑαυτοῦ νεοττούς ἵνα σωθῶσιν. τὴν γὰρ δειλίαν ὑπερβάλλει τοῦτο
- 30 τὸ ὀρνεον· τίλλεται γὰρ ὑπὸ τῶν μικρῶν ὀρνέων καὶ φεύγει αὐτά.

XXX οἱ δ' ἀποδες, οὓς καλοῦσί τινες κυψέλους, ὅτι μὲν ὅμοιοι ταῖς χελιδόσιν εἰσὶν εἴρηται πρότερον· οὐ γὰρ ῥάδιον γινῶναι πρὸς τὴν χελιδόνα πλὴν τῷ τὴν κνήμην ἔχειν δασεῖαν. οὗτοι νεοττεύουσιν

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and so they are destroyed. Others say that the bird who is rearing them actually kills them and gives them to be eaten, for because the cuckoo chick is beautiful she despises her own. Now most of this is agreed by people from personal observation; but as regards the destruction of the bird's own chicks they do not all say the same, but some say that the cuckoo itself on a subsequent visit devours the host bird's chicks, while others say that the cuckoo chick because of its superior size is the first to snap up the food being offered, so that the other chicks die of starvation, and others say that being stronger it kills them while it is being reared among them. It seems that the cuckoo manages its reproduction intelligently: for because it is conscious of its own cowardice and inability to give help, for this reason it makes its own chicks supposititious, as it were, in order to save them. For this bird is exceptionally cowardly: it has its feathers plucked by the little birds and runs away from them.

The footless birds which some call cypselus are like the swallows (we have said previously): it is not easy to distinguish them from the swallow except that the leg is shaggy. These nest in long cells

XXX

35 ἐν κυψελίσιν ἐκ πηλοῦ πεπλασμέναις μακραῖς,
 618b ὅσον εἰσδύσιν ἐχούσαις. ἐν στεγνῷ δὲ ποιεῖται τὰς
 νεοττείας ὑπὸ πέτραις καὶ σπηλαίοις, ὥστε καὶ
 τὰ θηρία καὶ τοὺς ἀνθρώπους διαφεύγειν. ὁ δὲ
 καλούμενος αἰγοθήλας ἔστι μὲν ὀρεινός, τὸ δὲ
 μέγεθος κοττύφου μὲν μικρῷ μείζων, κόκκυγος
 δ' ἐλάττων. τίκτει μὲν οὖν ὡς δύο ἢ τρία τὸ
 5 πλεῖστον, τὸ δὲ ἥθος ἔστι βλακικός. θηλάζει δὲ
 τὰς αἰγας προσπετόμενος, ὅθεν καὶ τοῦνομ' εἴλη-
 φεν· φασὶ δ' ὅταν θηλάσῃ τὸν μαστόν, ἀποσβέν-
 νυσθαί τε καὶ τὴν αἶγα ἀποτυφλοῦσθαι. ἔστι δ'
 οὐκ ὀξυωπὸς τῆς ἡμέρας, ἀλλὰ τῆς νυκτὸς
 βλέπει.

XXXI οἱ δὲ κόρακες ἐν τοῖς μικροῖς χωρίοις, καὶ ὅπου
 μὴ ἱκανὴ τροφή πλείοσι, δύο μόνοι γίνονται· καὶ
 11 τοὺς ἑαυτῶν νεοττούς, ὅταν οἰοί τ' ὥσιν ἤδη
 πέτεσθαι, τὸ μὲν πρῶτον ἐκβάλλουσιν, ὕστερον
 δὲ καὶ ἐκ τοῦ τόπου ἐκδιώκουσιν. τίκτει δ' ὁ
 κόραξ καὶ τέτταρα καὶ πέντε. περὶ δὲ τοὺς χρό-
 νους ἐν ᾧ¹ ἀπώλοντο οἱ Μηδίου ξένοι ἐν Φαρ-
 15 σάλῳ, ἐρημία ἐν τοῖς τόποις τοῖς περὶ Ἀθήνας
 καὶ Πελοπόννησον ἐγένετο κοράκων, ὥς ἐχόντων
 αἰσθησὶν τινα τῆς παρ' ἀλλήλων δηλώσεως.

XXXII τῶν δ' αἰετῶν ἐστὶ πλείονα γένη, ἓν μὲν ὁ

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fashioned out of mud, having just an entrance space. They make the nests under cover beneath rocks and caves so that they avoid both wild animals and humans. The so-called goat-sucker is a mountain bird, in size a little bigger than a blackbird but smaller than a cuckoo. Now it lays two eggs or three at most, and in character it is sluggish. It flies to the she-goats and milks them, from which it has got its name; and they say that after it has milked it the udder dries up and the goat goes blind. It is not sharp-eyed by day but sees by night.

The ravens, in small areas and where there is not enough food for more, occur only two together; and when their young have become able to fly they first expel them and later chase them right out of the place. The raven lays either four or five eggs. About the times when the mercenaries of Medius were destroyed at Pharsalus,^a the ravens deserted their places around Athens and the Peloponnese, suggesting that they have some perception of communication from each other.

XXXI

Of the eagles there are numerous kinds. One is

XXXII

^a In 395 or possibly 404 B.C.

¹ δ β γ Ald.: α δ Bk.

- καλούμενος πύγαργος· οὗτος κατὰ τὰ πεδία καὶ
 20 τὰ ἄλση καὶ περὶ τὰς πόλεις γίνεται· ἔνιοι δὲ
 καλοῦσιν νεβροφόνον αὐτόν. πέτεται δὲ καὶ εἰς
 τὰ ὄρη καὶ εἰς τὴν ὕλην διὰ τὸ θάρσος· τὰ δὲ
 λοιπὰ γένη ὀλιγάκις εἰς πεδία καὶ εἰς ἄλση
 φοιτᾷ. ἕτερον δὲ γένος αἰετοῦ ἐστὶν ὃ πλάγγος
 καλεῖται, δεύτερος μεγέθει καὶ ῥώμῃ· οἰκεῖ δὲ
 25 βήσσας καὶ ἄγγη¹ καὶ λίμνας, ἐπικαλεῖται δὲ
 νηττοφόνος καὶ μορφνός· οὗ καὶ Ὅμηρος μέμνη-
 ται ἐν τῇ τοῦ Πριάμου ἐξόδῳ. ἕτερος δὲ μέλας
 τὴν χροάν καὶ μέγεθος ἐλάχιστος καὶ² κράτιστος
 τούτων· οὗτος οἰκεῖ ὄρη καὶ ὕλας, καλεῖται δὲ
 μελανάετος καὶ λαγωφόνος. ἐκτρέφει δὲ μόνος
 30 τὰ τέκνα οὗτος καὶ ἐξάγει. ἔστι δὲ ὠκυβόλος καὶ
 εὐθήμων καὶ ἄφθονος καὶ ἄφοβος καὶ μάχιμος καὶ
 εὐφημος· οὐ γὰρ μινυρίζει οὐδὲ λέληκεν. ἔτι δ'
 ἕτερον γένος, περκόπτερος,³ λευκὴ κεφαλὴ,
 μεγέθει δὲ μέγιστος, πτερὰ δὲ βραχύτατα καὶ ὀρ-
 ροπύγιον⁴ πρόμηκες, γυπὶ ὅμοιος· ὀρειπέλαργος
 35 καλεῖται καὶ γυπαιετός.⁵ οἰκεῖ δ' ἄλση, τὰ μὲν
 κακὰ ταῦτά ἔχων τοῖς ἄλλοις, τῶν δ' ἀγαθῶν
 619a οὐδέν· ἀλίσκεται γὰρ καὶ διώκεται ὑπὸ κοράκων
 καὶ τῶν ἄλλων· βαρὺς γὰρ καὶ κακόβιος καὶ τὰ

¹ β Bk.: ἀγκη α γ Bk.

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the so-called white-rump; this occurs about the plains and the spinneys and the cities; some call it fawn-killer. It flies both to the mountains and to the woodland because it is bold; the other kinds rarely visit plains and spinneys. There is another kind of eagle called plangos, second in size and strength. It inhabits valleys and hollows and lakes, and is nicknamed duck-killer and morphnos: it is the one Homer mentions in the *Expedition of Priam*.^a Another is black in colour and smallest in size and the strongest of them: this inhabits mountains and woodlands and is called black eagle and hare-killer. This is the only one that completes the rearing of its young and escorts them out. It is quick-striking, orderly, free of jealousy and fear, pugnacious, and preserves silence (for it does not whimper nor scream). Also another kind, dark-winged, white head, in size very big but feathers very short and rump extended, resembling a vulture; it is called mountain stork and gypaetos. It inhabits spinneys, and has the same faults as the others but none of the good points; for it is caught and chased by ravens and the other birds; for it is heavy and lives

^a Hom. *Il.* 24. 316; cf. Hesiod *Shield* 134.

² om. α γ Bk.

³ περκνόπτερος O^crec. L^crec. Ald. edd.: incert. S^c: percnop-
terus Gaza

⁴ β E^a M^c L^crec. Ald.: δροπίγιον K^c L^cpr. n: οδροπίγιον α (οδρο- C^a) Bk.

⁵ β Ald.: υπάετος α Bk.: υπαιετός γ

- τεθνεῶτα φέρων, πονεῖ¹ δ' αἰ καὶ βοᾷ καὶ μινυ-
 ρίζει. ἕτερον δὲ γένος ἐστὶν αἰετῶν οἱ καλούμενοι
 5 ἀλισταί.² οὗτοι δ' ἔχουσιν αὐχένα τε μέγαν καὶ
 παχὺν καὶ πτερὰ καμπύλα ὀρροπύγιον³ δὲ
 πλατύ· οἰκοῦσι δὲ περὶ θάλατταν καὶ ἀκτὰς, ἀρ-
 πάζοντες δὲ καὶ οὐ δυνάμενοι φέρειν πολλάκις
 καταφέρονται εἰς βυθόν. ἔτι δ' ἄλλο γένος ἐστὶν
 αἰετῶν οἱ καλούμενοι γνήσιοι. φασὶ δὲ τούτους
 μόνους καὶ τῶν ἄλλων ὀρνίθων γνησίους εἶναι·
 10 τὰ γὰρ ἄλλα γένη μέμικται καὶ μεμοίχευται ὑπ'
 ἀλλήλων, καὶ τῶν αἰετῶν καὶ τῶν ἱεράκων καὶ
 τῶν ἐλαχίστων. ἔστι δ' οὗτος μέγιστος τῶν
 αἰετῶν ἀπάντων, μείζων τε τῆς φήνης, τῶν δ'
 αἰετῶν καὶ ἡμιόλιος, χρῶμα ξανθός. φαίνεται δ'
 ὀλιγάκις, ὥσπερ καὶ⁴ ἡ καλουμένη κύβινδις.⁵
 15 ὥρα δὲ τοῦ ἐργάζεσθαι αἰετῶ καὶ πέτεσθαι ἀπ'
 ἀρίστου μέχρι δειλῆς· τὸ γὰρ ἔωθεν κάθηται μέχρι
 ἀγορᾶς πληθυσίσης. γηράσκουσι δὲ τοῖς αἰετοῖς
 τὸ ῥύγχος αὐξάνεται τὸ ἄνω γαμψούμενον αἰ
 μᾶλλον, καὶ τέλος λιμῶ ἀποθνήσκουσιν. ἐπι-
 λέγεται δὲ τις καὶ μῦθος ὥς τοῦτο πάσχει διότι
 20 ἀνθρωπὸς ποτ' ὦν ἠδίκησε ξένον. ἀποτίθεται δὲ

¹ β γ Ald.: πείνη C^a O^crec.: πίνει A^a G^apr. F^a X^c: πινεῖ
 G^arec. Q Ott.: *gravis mali inoris* Scot.: *esurit* Guil. Trap.:

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poorly, takes dead animals and is always suffering and calls and whimpers. Another kind of eagles is the so-called sea eagles. Their neck is large and thick, feathers curved, rump broad. They dwell by sea and by coastal headlands; when seizing prey and unable to carry it they are often borne down into the deep water. Also another kind of eagles is the so-called true-bred. They say these are the only true-bred birds altogether; for the other kinds are mixed and adulterated by each other, including the eagles and hawks and the smallest birds. This is the largest of all the eagles, larger than the phene and half as big again as the eagles, in colour yellow. It appears rarely, like the so-called kubindis, too.

The eagle's time for working and flying is from lunch-time^a till evening, for it sits from dawn till full market.^b As eagles grow old the upper beak grows out more and more curved, and finally they die of starvation. A myth indeed is told about it, that it suffers this because once when it was a man it wronged a guest. It stores away the excess food

^a Ariston: man's midday meal in the cities frequented by this eagle (618b19).

^b The common expression for forenoon.

famelica Gaza: *πείνει* Canis.: *πεινῇ* Bk. edd.

² *β γ* Ald.: *ἀλιάετοι α*: *ἀλιάετοι* Bk.

³ *β* E^a P K^c M^c: *οὐροπύγιον α* (*οὐρο-* C^a) Bk.

⁴ om. *α γ* Bk.

⁵ C^a *β γ*: *κύμινδης* O^crec. L^c Ald. Guil. Trap. Gaza edd.: *κύβινδος α*

τὴν περιττεύουσιν τροφὴν τοῖς νεοττοῖς· διὰ
 γὰρ τὸ μὴ εὐπορον εἶναι καθ' ἑκάστην ἡμέραν
 αὐτὴν πορίζεσθαι, ἐνίοτε οὐκ ἔχουσιν ἔξωθεν
 κομίζειν. τύπτουσι δὲ ταῖς πτέρυξι καὶ τοῖς
 ὄνυξιν ἀμύττουσιν ἂν τινα λάβωσι σκευωρούμε-
 25 νον περὶ τὰς νεοττείας. ποιοῦνται δ' αὐτὰς οὐκ
 ἐν πεδινοῖς τόποις ἀλλ' ἐν ὑψηλοῖς, μάλιστα μὲν
 ἐν πέτραις ἀποκρήμνοις, οὐ μὴν ἀλλὰ καὶ ἐπὶ
 δένδρων. τρέφουσι δὲ τοὺς νεοττοὺς ἕως ἂν
 δυνατοὶ γένωνται πέτεσθαι· τότε δ' ἐκ τῆς νεο-
 ττείας αὐτοὺς ἐκβάλλουσι καὶ ἐκ τοῦ τόπου τοῦ
 30 περὶ αὐτὸν¹ παντὸς ἀπελάυνουσιν. ἐπέχει γὰρ
 ἐν ζευγος αἰτῶν πολὺν τόπον· διόπερ οὐκ ἐᾷ
 πλησίον αὐτῶν² ἄλλους αὐλισθῆναι. τὴν δὲ
 θήραν ποιοῦνται³ οὐκ ἐκ τῶν σύνεγγυς τόπων
 τῆς νεοττείας ἀλλὰ συχνὸν ἀποπτὰς. ὅταν δὲ
 κυνηγήσῃ καὶ ἄρῃ, τίθησι καὶ οὐκ εὐθὺς φέρει,
 ἀλλ' ἀποπειραθεὶς τοῦ βάρους ἀφήσιν. καὶ τοὺς
 619b δασύποδας δ' οὐκ εὐθὺς λαμβάνει ἀλλ' εἰς τὸ
 πεδίον ἑάσας προελθεῖν· καὶ καταβαίνει⁴ οὐκ
 εὐθὺς εἰς τὸ ἔδαφος ἀλλ' αἰεὶ ἀπὸ τοῦ μείζονος
 ἐπὶ τὸ ἔλαττον κατὰ μικρόν. ἄμφω δὲ ταῦτα
 ποιεῖ πρὸς ἀσφάλειαν τοῦ μὴ ἐνεδρεύεσθαι. καὶ
 5 ἐφ' ὑψηλῶν καθίζει διὰ τὸ βραδέως αἵρεσθαι ἀπὸ

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for the nestlings; for because it is not easy to procure it each day, sometimes they have nothing to bring back from outside. They strike with the wings and tear with the claws if they catch someone paying attention to their nests. They build them not in the plains but on high places, mostly on precipitous rocks, though also on trees. They rear the nestlings until they become able to fly; then they expel them from the nest and drive them away from the whole region around it. For one pair of eagles occupies much space, and therefore they do not allow others to be quartered near them. They hunt their prey not from places adjoining the nest but a considerable flight away. After hunting and making a catch, the eagle sets it down and does not immediately carry it off but lets go of it after trying its weight. Moreover it does not immediately catch the hares but only after letting them go forward into the plain. And then it comes down to ground level not straight but little by little from greater to lesser.^a Both these things it does for protection against ambush. And it settles on high places because it is slow to be borne

^a Either from greater to lesser heights, as A.-W. and Th. take it, or from greater to lesser distances—i.e. in diminishing circles—as Scaliger translates it, followed by Camus and the French translators.

¹ C^a β E^a P K^c Ald.: ἀντῶν α: ἀντῆν L^c n edd.: ἀντοὺς M^c ² ἀντοῦ α (exc. C^a): ἀντῶν edd.

³ cett. Ald.: ποιεῖται α E^a rec. n edd.: ποιεῖ L^c

⁴ καταβ. δ' α (exc. C^a) Bk.

τῆς γῆς. ὑψοῦ δὲ πέτεται ὅπως ἐπὶ πλεῖστον
τόπον καθορᾷ· διόπερ θεῖον οἱ ἄνθρωποι φασιν
εἶναι μόνον τῶν ὀρνέων. πάντες δ' οἱ γαμψώνυ-
χοι ἥκιστα καθιζάνουσιν ἐπὶ πέτρα¹ διὰ τὸ τῇ
γαμψότητι ἐμπόδιον εἶναι τὴν σκληρότητα. θη-
10 ρεύει δὲ λαγῶς καὶ νεβροὺς καὶ ἀλώπεκας καὶ τὰ
λοιπὰ ὅσων κρατεῖν οἶός τ' ἐστίν. μακρόβιος δ'
ἐστίν· δηλὸν δὲ τοῦτο ἐκ τοῦ πολὺν χρόνον² τὴν
νεοττεῖαν τὴν αὐτὴν³ διαμένειν.⁴

XXXIII ἐν δὲ Σκύθαις γένος ἐστὶν ὀρνίθων⁵ οὐκ ἔλατ-
τον ὠτίδος· τοῦτο τέκτει δύο νεοττούς, οὐκ ἐπι-
15 κάθηται δὲ ἄλλ' ἐν δέρματι λαγωῦ ἢ ἀλώπεκος
ἐγκύψαν ἐᾷ· ἐπ' ἄκρῳ δὲ τῷ δένδρῳ φυλάττει
ὅταν μὴ τύχῃ θηρεύων· κἂν τις ἀναβαίῃ μάχε-
ται καὶ τύπτει ταῖς πτέρυξιν ὥσπερ οἱ ἀετοί.

XXXIV γλαῦκες δὲ καὶ νυκτικόρακες, καὶ τὰ λοιπὰ
ὅσα τῆς ἡμέρας ἀδυνατεῖ βλέπειν, τῆς νυκτὸς
20 μὲν θηρεύοντα τὴν τροφὴν αὐτοῖς πορίζεται, οὐ
κατὰ πᾶσαν δὲ τὴν νύκτα τοῦτο ποιεῖ ἄλλ' ἄχρι
ἑσπερίου καὶ περὶ ὄρθρον· θηρεύει δὲ μῦς καὶ
σαύρας καὶ σφονδύλας καὶ τοιαῦτ' ἄλλα ζῴδια.

ἡ δὲ καλουμένη φήνη ἐστὶν εὐτεκνος καὶ εὐ-
βίωτος καὶ δειπνοφόρος καὶ ἥπιος, καὶ τὰ τέκνα
25 ἐκτρέφει καὶ τὰ αὐτῆς καὶ τὰ τοῦ ἀετοῦ. καὶ

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up from the ground. It flies high in order to see over the greatest area; because of this men say that it is divine, alone among birds. All the crook-taloned birds settle very little on rock because its hardness is a hindrance to the crookedness of the talons. It hunts hares, fawns, foxes, and all others that it can overcome. It is long-lived: this is evident from the fact that the nest remains the same for a long time.

Among the Scythians there is a kind of bird no smaller than the bustard; this produces two chicks; it does not sit over them but leaves them hidden in the skin of a hare or fox. It keeps guard on the top of the tree when it is not actually hunting; and if anyone climbs up, it fights and strikes with its wings like the eagles.

XXXIII

Owls and night ravens and all others that cannot see by day procure their food by hunting at night, but they do not do this throughout the night but so long as evening lasts and around dawn; they hunt mice and lizards and beetles and such other small animals.

XXXIV

The so-called phene^a is a good parent, lives well, brings meals home, is gentle, and rears not only its own young but those of the eagle too. For when the

^a Probably the Lämmergeier, *Gypaetus barbatus*.

¹ πέτραις α Guil. Bk.

² πολὺν χρόνον om. α γ Ald. Bk. Dt. ³ αὐτῶν α Bk.

⁴ ante διαμ. add. ἐπὶ πολὺν α Bk. Dt.: δὴ E^a P K^c: ἀεὶ L^c n Ald. ⁵ ὀρνίθων post σκίθαις transp. α γ Bk.

γὰρ ταῦθ' ὅταν ἐκβάλλῃ ἐκείνος ἀναλαβοῦσα
 τρέφει· ἐκβάλλει γὰρ ὁ αἰτὸς πρὸ ὥρας, ἔτι βίου
 δεόμενα καὶ οὐπω δυνάμενα πέτεσθαι. ἐκβάλ-
 λειν δὲ δοκεῖ ὁ αἰτὸς τοὺς νεοττοὺς διὰ φθόνον·
 φύσει γάρ ἐστι φθονερός καὶ ὀξύπεινος, ἔτι δὲ
 30 ὀξυλαβῆς. λαμβάνει δὲ μέγα ὅταν λάβῃ, φθονεῖ
 οὖν τοῖς νεοττοῖς ἀδρυνομένοις ὅτι φαγεῖν ἀγαθοὶ
 γίνονται, καὶ σπᾶ τοῖς ὄνυξιν. μάχονται δὲ καὶ
 οἱ νεοττοὶ καὶ¹ ἑαυτοῖς περὶ τῆς ἕδρας καὶ τῆς
 τροφῆς· ὁ δ' ἐκβάλλει καὶ κόπτει αὐτούς· οἱ δ'
 ἐκβαλλόμενοι βοῶσι, καὶ οὕτως ὑπολαμβάνει
 620a αὐτοὺς ἢ φήνῃ. ἢ δὲ φήνῃ ἐπάργεμός τ' ἐστὶ
 καὶ πεπήρωται τοὺς ὀφθαλμούς· ὁ δ' αἰτὸς²
 ὀξυωπέστατος μὲν ἐστὶ, καὶ τὰ τέκνα ἀναγκάζει
 ἔτι ψιλὰ ὄντα πρὸς τὸν ἥλιον βλέπειν, καὶ τὸν
 μὴ βουλόμενον κόπτει καὶ στρέφει, καὶ ὁποτέρου
 5 ἂν ἔμπροσθεν οἱ ὀφθαλμοὶ δακρύσωσιν τοῦτον
 ἀποκτείνει, τὸν δ' ἕτερον ἐκτρέφει. διατρίβει δὲ
 περὶ θάλατταν καὶ ζῇ θηρεύων τοὺς περὶ τὴν
 θάλατταν ὄρνιθας, ὥσπερ εἴρηται. θηρεύει δ'
 ἀπολαμβάνων καθ' ἓνα, παρατηρῶν ἀναδυόμενον
 ἐκ τῆς θαλάττης. ὅταν δ' ἴδῃ ὁ ὄρνις ἀνα-
 κύπτων τὸν ἀλιάετον, πάλιν φοβηθεὶς καταδύε-
 10 ται ὥς ἑτέρα ἀνακύψων· ὁ δὲ διὰ τὸ ὀξὺ ὄραν αἰεῖ

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eagle has expelled them, she recovers them and feeds them; for the eagle expels them prematurely when they still lack a living and cannot yet fly. It is believed that the eagle expels the nestlings because of jealousy; for it is naturally jealous and voracious, and also it is quick to seize food. It seizes a large amount when it does, and therefore envies the chicks as they grow mature, because they become good at eating, and tears at them with its claws. The chicks too fight among themselves as well over their position and their food. And the eagle expels and strikes them; and as they are being expelled they cry, and at this point the phene picks them up. The phene has white film^a over the eyes and is defective in them. But the eagle is very sharp-sighted and compels its young while still featherless to look towards the sun, and strikes any that refuses and turns it round; and it kills whichever of them first gets tears in its eyes, and rears the other. It spends its time by sea and lives by hunting the sea birds, as we have said.^b It hunts by intercepting them one at a time, watching for one emerging from the sea. When the bird comes up and sees the sea eagle, it plunges down again in fear, so as to come up elsewhere; but the eagle because of its sharp

^a Cf. 609b16.

^b 619a6, cf. VII(VIII) 593b23.

¹ om. G^a rec. Q F^a X^c Ald. Bk.

² β γ Guil. Ald.: ἀλιέτος α Trap. Gaza edd.

πέτεται ἕως ἂν ἀποπνίξῃ ἢ λάβῃ μετέωρον.
 ἀθρόαις δὲ¹ οὐκ ἐπιχειρεῖ· ῥαίνουσαι γὰρ ἀπερύ-
 κουσι ταῖς πτέρυξιν.

XXXV οἱ δὲ κέμφοι² ἀλίσκονται τῷ ἀφρῶ· κόπτουσι³
 γὰρ αὐτόν, διὸ προσραίνοντες θηρεύουσιν. ἔχει δὲ
 15 τὴν μὲν ἄλλην σάρκα εὐώδη, τὸ δὲ πυγαῖον
 μόνον θινὸς ὄζει. γίνονται δὲ πόνες.

XXXVI τῶν δ' ἱεράκων κράτιστος μὲν ὁ τριόρχης, δεύ-
 τερος δ' ὁ αἰσάλων, τρίτος ὁ κίρκος. ὁ δ' ἀστε-
 ρίας καὶ ὁ φασσοφόνος καὶ ὁ πτέρνις ἄλλοιοι. οἱ
 20 δὲ πλατύτεροι ἱέρακες ὑποτριόρχαι καλοῦνται,
 ἄλλοι δὲ πέρκοι καὶ σπίζαι,⁴ οἱ δὲ λείοι καὶ οἱ
 φρυνολόγοι· οὗτοι εὐβιώτατοι καὶ χθαμαλοπτῆ-
 ται. γένη δὲ τῶν ἱεράκων φασί τινες εἶναι οὐκ
 ἐλάττω τῶν δέκα, διαφέρουσι δ' ἀλλήλων· οἱ
 μὲν γὰρ αὐτῶν ἐπὶ τῆς γῆς καθημένην τύπτουσι
 25 τὴν περιστερὰν καὶ συναρπάζουσι, πετομένης δ'
 οὐ θιγγάνουσιν· οἱ δ' ἐπὶ δένδρου μὲν ἢ τινος
 ἄλλου καθημένην θηρεύουσιν, ἐπὶ τῆς γῆς δ'
 οὔσης ἢ μετεώρου οὐχ ἅπτονται· οἱ δ' οὔτ' ἐπὶ
 τῆς γῆς οὔτ' ἐπ' ἄλλου καθημένης θιγγάνουσιν

¹ β Guil. Sn. Dt.: γὰρ α γ Ald. Bk.

² cett.: κέμφοι O^ccorr. E^acorr. L^cpr. nrec. Ald. edd.: *kephi*
 Guil.: *fulicae* Gaza.

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sight keeps flying until he either drowns it or takes it on the surface. But he does not attack them when they are all together, for they keep him off by splashing him with their wings.

The kemphos is caught by means of foam; for they peck at it, and so they hunt them by splashing it on to them. Their flesh has a good odour generally, but the rump alone smells of mud.^a They grow fat. XXXV

Among the hawks, the strongest is the buzzard, second the merlin, third the kirkos. The starred hawk, the pigeon-killer and the pternis differ from them. The broader hawks are called half-buzzards. Others are perkos and spizas and the smooth hawks^b and the toad-catchers; the latter live the best and fly along the ground. Some say there are not less than ten kinds of hawks. They differ from each other: some strike and snatch up the common pigeon when it is sitting on the ground but do not touch it when it is flying; others hunt it when it is sitting on a tree or some other perch but do not take it when it is on the ground or in the air; others do not touch it sitting either on the ground or on any- XXXVI

^a Cf. VII(VIII) 598a5 note. Mud or sand is a more probable sense than "shore weed" which is given by LSJ and Th.

^b Unidentifiable. Following Hesych. ἐλειός· εἶδος ἱέρακος, edd. have conjectured ἐλειοί, "marsh-dwelling".

³ β γ Ald.: κάππουσι α Bk.

⁴ codd. Gaza Ald.: σπιζίαι Guil. edd.

ἀλλὰ πετομένην πειρῶνται λαμβάνειν. φασὶ δὲ
καὶ τὰς περιστερὰς γινώσκειν ἕκαστον τούτων
30 τῶν γενῶν, ὥστε προσπετομένων, ἐὰν μὲν ᾗ τῶν
μετεωροθήρων, μένειν ὅπου ἂν καθήμεναι τύχω-
σιν, ἐὰν δ' ᾗ τῶν χαμαιτύπων ὁ προσπετόμενος,
οὐχ ὑπομένειν ἀλλ' ἀναπέτεσθαι.

ἐν δὲ Θράκῃ τῇ καλουμένῃ ποτὲ Κεδρειπο-
λιὸς¹ ἐν τῷ ἔλει θηρεύουσιν οἱ ἄνθρωποι τὰ ὀρνί-
35 θια κοινῇ μετὰ τῶν ἱεράκων· οἱ μὲν γὰρ ἔχοντες
620b ξύλα σοβοῦσι τὸν κάλαμον καὶ τὴν ὕλην ἵνα
πέτῳνται τὰ ὀρνίθια, οἱ δ' ἱέρακες ἄνωθεν ὑπερ-
φαινόμενοι καταδιώκουσιν· ταῦτα δὲ φοβούμενα
κάτω πέτονται πάλιν πρὸς τὴν γῆν· οἱ δ'
ἄνθρωποι τύπτοντες τοῖς ξύλοις λαμβάνουσι, καὶ
5 τῆς θήρας μεταδιδόασιν αὐτοῖς· ῥίπτουσι γὰρ
τῶν ὀρνίθων, οἱ δὲ ὑπολαμβάνουσιν. καὶ περὶ
τὴν Μαιῶτιν δὲ λίμνην τοὺς λύκους φασὶ συνή-
θεις εἶναι τοῖς ποιουμένοις τὴν θήραν τῶν
ἰχθύων· ὅταν δὲ μὴ μεταδιδῶσι, διαφθείρειν
αὐτῶν τὰ δίκτυα ξηραίνόμενα ἐν τῇ γῇ.

τὰ μὲν οὖν περὶ τοὺς ὀρνίθας τοῦτον ἔχει τὸν
τρόπον.

XXXVII ἔστι δὲ καὶ ἐν τοῖς θαλαττίοις ζώοις πολλὰ

¹ β L^c rec. : κέδρει πόλιος E^a n: κεδρειπόλιος P K^c M^c: κεδρο-

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thing else but try to take it in flight. And they say that the pigeons in fact learn to recognise each of these kinds so that as they approach, if it is one of those that hunt in the air, they stay wherever they happen to be sitting, but if the attacker is one of those that strike on the ground they do not wait for it but take to flight.

In the part of Thrace once named as belonging to Kedriopolis^a men hunt the small birds in the marsh in partnership with the hawks. The men hold sticks and stir the reeds and brushwood to make the small birds fly, while the hawks from above appear overhead and chase them down. In fear they fly down again to the ground; the men strike them with the sticks and take them, and give the hawks a share in the prey: they throw them some of the birds and the hawks catch them. And around the Maiotis lake^b too they say the wolves are habituated to the men who bring in the catch of fishes, and when they do not give them a share they destroy their nets as they are drying on the ground.

This then is the position regarding the birds.

In the marine animals too it is possible to observe XXXVII

^a Kedriopolis or Ketriporis, an early 4th-century king of part of Thrace (Dittenberger, *Hermes* XIV 1879, 298). *Mirab.* 118 841b15 reports the same from "Thrace beyond Amphipolis". ^b The Sea of Azov.

- 11 τεχνικὰ θεωρῆσαι πρὸς τοὺς ἐκάστων βίους. τά
 τε γὰρ θρυλλούμενα¹ περὶ τὸν βάτραχον τὸν
 ἀλιέα καλούμενόν ἐστιν ἀληθῆ καὶ τὰ περὶ τὴν
 νάρκην. ὁ μὲν γὰρ βάτραχος τοῖς πρὸ τῶν
 ὀφθαλμῶν ἀποκρεμαμένοις, ὧν τὸ μὲν μῆκός
 15 ἐστι τριχοειδές, ἐπ' ἄκρου δὲ στρογγύλον, ὥσπερ
 προσκείμενον ἐκατέρω δελέατος χάριν, ὅταν² ἐν
 τοῖς ἀμμώδεσιν ἢ θολώδεσιν ἀναταράξας κρύψῃ
 ἑαυτόν, ἐπαίρει τὰ τριχώδη, κοπτόντων δὲ τῶν
 ἰχθυδίων συγκατάγει μέχρι περ ἂν πρὸς τὸ στόμα
 προσαγάγῃ. ἢ τε νάρκη ναρκαῶν ποιοῦσα ὧν ἂν
 20 κρατήσῃν μέλλῃ ἰχθυδίων,³ τῷ τρόπῳ ὃν ἔχει
 ἐν τῷ σώματι⁴ λαμβάνουσα, τρέφεται τούτοις·
 κατακρύπτεται δ' εἰς τὴν ἄμμον καὶ πηλόν,
 λαμβάνει δὲ τὰ ἐπινέοντα ὅσα ἂν ναρκήσῃ
 ἐπιφερόμενα τῶν ἰχθύων· καὶ τούτου αὐτόπται
 γεγέννηται τινες. κατακρύπτει δὲ καὶ ἡ τρυγῶν
 25 αὐτήν, πλὴν οὐχ ὁμοίως. σημεῖον δ' ὅτι τοῦτον
 τὸν τρόπον ζῶσιν· ἀλίσκονται γὰρ ἔχοντες
 κεστρέας πολλάκις ὄντες αὐτοὶ βραδύτατοι, τὸν
 τάχιστον τῶν ἰχθύων. ἔπειτα ὁ μὲν βάτραχος,
 ὅταν μηκέτ' ἔχῃ τὰ ἐπὶ ταῖς θριξίν, ἀλίσκεται

¹ α β P M^c L^c Ald.: θρυλούμενα E^a L^c n Bk.

² ὅταν οὖν α γ Ald. Bk.

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many instances of ingenuity directed towards each one's living. For the common stories about the batrachos, the so-called fisherman, are true, and also those about the torpedo. For the batrachos by means of the things hanging in front of its eyes, the length of which is hairlike but rounded at the tip, as though set on each side to be a bait, after making a stir in the sand or mud and hiding itself, lifts up the hairlike parts and when the small fishes strike them draws these parts in until it has brought them to its mouth. And the torpedo by causing numbness in whatever small fishes it intends to overcome, catching them by the means which it possesses in its body,^a feeds on them; it hides itself in the sand and mud, and catches all the fishes that swim towards it and become numbed as they are carried near; this has been actually observed by some people. The sting-ray too hides itself, though not in the same way. There is evidence that they live in this manner. For they are often caught with grey mullets inside, though they themselves are the slowest of fishes while the grey mullet is the swiftest. Secondly, the batrachos, when it no longer has the parts at the ends of the hairs, is thinner

^a The MSS vary between "body" and "mouth", which are easily confused in Greek minuscule and often appear as variants; cf. IX(VII) 581b19, 583a16, X 634b27, 635a28.

³ β: λχθύων α γ Ald. Bk.: *pisciculi* Guil.: *pisces* Gaza

⁴ α γ Gaza Cs. Sn. Dt. Th.: σρόματι β L^c Guil. Ald. Bk.

λεπτότερος· ἡ δὲ νάρκη φανερά ἐστι καὶ τοὺς
 ἀνθρώπους ποιοῦσα ναρκαῖν. καθαρμίζουσι δ'
 30 ἑαυτὰ καὶ ὄνος καὶ βάτραχος¹ καὶ ψῆττα καὶ
 ῥίνη, καὶ ὅταν ποιήσῃ ἑαυτὰ ἄδηλα εἶτα ῥαβδεύ-
 εται τοῖς ἐν τῷ στόματι ἃ καλοῦσιν οἱ ἄλιεῖς
 ῥαβδία· τὰ δὲ μικρὰ ἰχθύδια προσέρχονται² ὥς
 πρὸς φυκία ἀφ' ὧν τρέφονται.

ὅπου δ' ἂν ἀνθίας ᾗ³ οὐκ ἔστι θηρίον· ᾧ καὶ
 σημεῖω χρώμενοι κατακολυμβῶσιν οἱ σπογγεῖς,
 35 καὶ καλοῦσιν ἱεροὺς ἰχθύς τούτους. ἔοικε δὲ συμ-
 621a πτώματι, καθάπερ ὅπου ἂν ᾗ κοχλίας σὺς οὐκ
 ἔστιν οὐδὲ πέρδιξ· κατεσθίουσι γὰρ ἅμφω τοὺς
 κοχλίας.

ὁ δ' ὄφεις ὁ θαλάττιος τὸ μὲν χρῶμα παραπλή-
 σιον ἔχει τῷ γόγγρω καὶ τὸ σῶμα, πλήν ἐστι
 μυουρότερος⁴ καὶ σφοδρότερος. ἐὰν δὲ φοβηθῇ⁵
 5 καὶ ἀφεθῇ, εἰς τὴν ἄμμον καταδύεται ταχὺ τῷ
 ῥύγχει διατρυπήσας· ἔχει δ' ὀξύτερον τὸ στόμα

¹ codd. Scot. Guil. Ald.: *raiae* Gaza: *βάτος* coni. Scal. Sn. Bk. Dt.

² τὰ δὲ μ. ἰ. πρ. β L^{rec}. Scot. Guil. Gaza Ald. Dt.: *προσέρχονται* δ' α γ Bk.: τὰ δὲ ἰχθύδια πρ. G^{rec}. Q Ott.

³ ᾗ β Gaza Dt.: *ὄραθη* α γ Guil. Ald. Bk.

⁴ β A.-W. Dt. Th.: *ἀμαυρότερος* α γ O^{rec}. Guil. Gaza Ald. Bk.

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when caught. And the torpedo is seen to cause numbness in humans too. Both hake and batrachos and psetta and angel-fish hide in the sand and, after making themselves invisible, fish with the things in their mouths that the fishermen call little rods; the small fishes come to them as though to the seaweeds on which they feed.

Wherever there is an anthias there is no savage creature; the sponge-divers use it as a sign and dive, and they call these sacred fishes. But it seems to be a side-effect,^a just as wherever there is a snail there is no pig nor partridge: for both eat up the snails.

The sea snake^b is very like the conger in colour and in body, except that it is more tapering and more active. If it is frightened and allowed to go, it burrows down into the sand, boring a hole quickly with its snout; its mouth is more pointed than that

^a Not a random coincidence but a necessary concomitant. The anthias does not drive away the savage creatures, nor does it appear in order to signal safety, nor is safety a random coincidence with the appearance of anthias; it appears because it has not been eaten. The divers' safety is therefore a secondary effect, concomitant with the presence of anthias, caused by the absence of savage creatures. Necessary accidents are an important concept in Arist.'s method of explanation, cf. *Cat.* 9b20, *Met.* N 1093b17, *PA* IV 677a18, *GA* IV 777b8, and another small example at 626a29 below.

^b Cf. II 505b8.

⁵ $\phi\omicron\beta\eta\theta\eta$ cett. Guil. Ald. Dt.: $\lambda\eta\phi\theta\eta$ A^arec. (ut vid.) Gaza Sn. Bk.

- τῶν ὄψεων. ἦν δὲ καλοῦσι σκολόπενδραν, ὅταν καταπίῃ τὸ ἄγκιστρον, ἐκτρέπεται τὰ ἐντὸς ἐκτὸς ἕως ἂν ἐκβάλλῃ¹ τὸ ἄγκιστρον· εἴθ' οὕτως εἰστρέπεται πάλιν ἐντὸς. βαδίζουσι δ' αἱ σκολό-
 10 πενδραι πρὸς τὰ κνισώδη, ὥσπερ καὶ αἱ χερσαῖαι. τῷ μὲν οὖν στόματι οὐ δάκνουσι, τῇ δὲ ὄψει² καθ' ὅλον τὸ σῶμα, ὥσπερ αἱ καλούμεναι κνίδαι. τῶν δ' ἰχθύων αἱ ὀνομαζόμεναι ἀλώπεκες, ὅταν αἰσθῶνται ὅτι τὸ ἄγκιστρον καταπεπώκασι, βοη-
 15 θοῦσι πρὸς τοῦτο ὥσπερ καὶ ἡ σκολόπενδρα· ἀναδραμοῦσαι γὰρ ἐπὶ πολὺ πρὸς τὴν ὀρμιᾶν ἀποτρώσουσιν αὐτῆς· ἀλίσκονται δὲ³ περὶ ἐνίους τόπους πολυαγκίστροις ἐν βρώδεσι καὶ βαθέσι τόποις. συστρέφονται δὲ καὶ αἱ ἄμμαι ὅταν τι θηρίον ἴδωσι, καὶ κύκλῳ αὐτὸ⁴ περιnéουσιν αἱ μέγισται, κἂν ἄπτηταί τινος ἀμύνουσιν· ἔχουσι δ' ὀδόντας ἰσχυροῦς, καὶ ἥδη ὥπται καὶ ἄλλα καὶ
 20 ἄμμαι⁵ ἐμπεσοῦσα καὶ καθελκωθεῖσα.

τῶν δὲ ποταμίων ὁ γλάνις ὁ ἄρρην περὶ τὰ

¹ ἐκβάλλῃ G^a Q β P M^c n Guil. Ald.: ἐκβάλλῃ α E^a K^c L^c Bk. Dt.

² codd. Guil. Ald.: tactu Gaza: ἄψει coni. Sylb. edd.

³ β L^c rec. Guil. Ald. Sn. Dt.: γὰρ α γ Bk.

⁴ β: αὐτῶν α γ Ald. Bk.

⁵ β L^c rec. Ald.: λάμμαι α O^c rec. γ Bk.: lamia Guil. Gaza

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of the snakes. The so-called scolopendra,^a after swallowing the hook, turns inside out until it expels the hook; having done so it then turns its inside back in again. The scolopendras go to things that smell of fat, as do the land scolopendras. Now they do not bite with the mouth but apparently along the whole body, like the so-called knide.^b Among fishes those named foxes,^c after perceiving that they have swallowed the hook, take counter-measures just as the scolopendra does: they run back a long way to the fishing line and bite a piece out of it. But they are caught in certain areas on multiple-hook lines in rapid deep water. The bonitos too collect together when they have seen some savage creature, and the biggest of them swim round it in a circle and drive it off if it touches one. Their teeth are strong, and before now even a bonito among others has been seen wounded all over after falling among them.

Among the river fishes the male glanis^d takes

^a Cf. II 505b13.

^b Nettle; cf. III 522a8 (land nettle, *Urtica*), V 548a23 (sea nettle, *Actinia*). Another word for nettle is ἀκαλήφη. PA IV 681a36 equates the marine *knide* with the marine *akalephe*, but in HA the two are reported independently. For the HA reports of *akalephe* see I 487a25, b12, IV 531a31, b10, VII(VIII) 588b20, 590a27, 31, all referring to the sea nettle or anemone.

^c Fox-sharks; cf. VI 565b1, 566a31.

^d Glanis: the famous *Parasilurus Aristotelis*, cf. VI 568b13 note and Th. G.G.F.

τέκνα ποιεῖται ἐπιμέλειαν πολλήν· ἡ μὲν γὰρ
 θήλεια τεκοῦσα ἀπαλλάττεται, ὁ δ' ἄρρην οὐ ἂν
 πλείστον συστήῃ τοῦ κυήματος ὠφουλακεῖ παρα-
 μένων, οὐδεμίαν ὠφέλειαν ἄλλην παρεχόμενος
 25 πλὴν ἐρύκων τᾶλλα ἰχθύδια μὴ διαρπάσῃσι τὸν
 γόνον· καὶ τοῦτο ποιεῖ ἡμέρας καὶ τετταράκοντα
 καὶ πεντήκοντα ἕως ἂν αὐξηθῇς ὁ γόνος δύνῃται
 διαφεύγειν ἀπὸ τῶν ἄλλων ἰχθύων. γινώσκεται
 δ' ὑπὸ τῶν ἀλιέων οὐ ἂν τύχῃ ὠφουλακῶν· ἐρύ-
 κων γὰρ τὰ ἰχθύδια ἄττει καὶ ἥχον ποιεῖ καὶ
 30 μυγμόν. οὕτω δὲ φιλοστόργως μένει πρὸς τοῖς
 ὦοις ὥστε οἱ ἀλιεῖς ἐκάστοτε, ἔαν ἐν βαθείαις
 ῥίζαις τὰ ὡὰ προσῇ, ἀνάγουσιν ὥς ἂν δύνωνται
 εἰς βραχύτατον· ὁ δ' ὁμοίως οὐκ ἀπολείπει τὸν
 γόνον, ἀλλ' ἔαν μὲν τύχῃ ταχέως ὑπὸ τοῦ ἀγκί-
 στρου ἐάλω διὰ τὸ ἀρπάζειν τὰ προσιόντα τῶν
 621b ἰχθυδίων, ἔαν δ' ἦ συνήθης καὶ ἀγκιστροφάγος,
 λείπει μὲν οὐδ' ὥς τὸν γόνον τῷ δ' ὀδόντι τῷ
 σκληροτάτῳ συνδάκνων διαφθείρει τὰ ἀγκιστρα.

ἅπαντα δὲ καὶ τὰ πλωτὰ καὶ τὰ μόνιμα τού-
 τους νέμεται τοὺς τόπους ἐν οἷς ἂν φυῶσι καὶ
 5 τοὺς ὁμοίους τούτοις· ἡ γὰρ οἰκεία τροφή ἐκά-
 στων ἐν τούτοις ἐστίν. πλανᾶται δὲ μάλιστα τὰ
 σαρκοφάγα· πάντα δὲ σχεδόν ἐστι σαρκοφάγα

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great care of the young. For the female separates from them after giving birth, but the male stays by and guards the eggs wherever the most part of the spawn has set; he confines his defensive efforts to warding off the other small fishes from stealing the embryos; and this he does for as many as forty or fifty days, until the embryos have grown and can make their escape from the other fishes. He is recognised by the fishermen wherever he happens to be on guard, for in warding off the small fishes he darts at them and makes a sound and a murmur. He stays by the eggs with such devotion that the fishermen, on every occasion when the eggs adhere among deep roots, draw them up to as shallow a place as they can; but all the same he does not desert the embryos but, if it so happens, gets caught quickly by means of the hook because he is snapping at the small fishes that approach; but if he is experienced and used to biting hooks he still does not leave the embryos but crushes the hooks with the hardest of his teeth and destroys them.

All fishes, both the migrant and the stationary, feed in those places in which they were formed and in places like them,^a for the food proper to each is in these places. Those that wander most are the carnivores, and nearly all are carnivores except a few

^a Cf. VII(VIII) 589a8 and note at 589a10.

πλήν ὀλίγων, οἷον κεστρέως καὶ σάλπης καὶ τρίγλης καὶ χαλκίδος. τὴν δὲ καλουμένην φωλίδα¹ ἢ μύξα ἦν ἀφίησι περιπλάττεται περὶ αὐτὴν καὶ γίνεται καθάπερ θαλάμη.

- 10 τῶν δ' ὀστρακοδέρμων καὶ ἀπόδων ὁ κτεῖς μάλιστα καὶ πλεῖστον κινεῖται δι' αὐτοῦ πετόμενος· ἡ γὰρ πορφύρα ἐπὶ μικρὸν² προέρχεται καὶ τὰ ὅμοια ταύτῃ.

- ἐκ δὲ τοῦ εὐρίπου τοῦ ἐν Πύρρᾳ οἱ ἰχθύες χειμῶνος μὲν ἐκπλέουσιν ἔξω, πλήν κωβιοῦ, διὰ τὸ ψυχρός (ψυχρότερος γὰρ ἔστιν ὁ εὐριπος), ἅμα δὲ
15 τῷ ἔαρι πάλιν εἰσπλέουσιν. οὐ γίνεται δ' ἐν τῷ εὐρίπῳ οὔτε σκάρος οὔτε θρίττα οὔτε ἄλλο τῶν ἀνθηροτέρων³ οὐθέν, οὐδὲ γαλεοὶ οὐδὲ ἀκανθίαι οὐδὲ κάραβοι οὐδὲ πολύποδες οὐδὲ βολίταιναι οὐδ' ἄλλ' ἄττα· τῶν δ' ἐν τῷ εὐρίπῳ φυομένων οὐκ ἔστι πελάγιος ὁ λευκὸς κωβίος. ἀκμάζουσι
20 δὲ τῶν ἰχθύων οἱ μὲν ὠοφόροι τοῦ ἔαρος μέχρι οὗ ἂν ἐκτέκωσιν, οἱ δὲ ζωοτόκοι τοῦ μετοπώρου καὶ πρὸς τούτοις κεστρεῖς καὶ τρίγλαι καὶ τᾶλλα τὰ τοιαῦτα. πάντα δὲ καὶ τὰ πελάγια καὶ τὰ εὐριπώδη⁴ τίκτει ἐν τῷ εὐρίπῳ· ὀχεύονται μὲν γὰρ τοῦ μετοπώρου, τίκτουσι δὲ τοῦ ἔαρος. ἔστι δὲ
25 καὶ τὰ σελάχη κατὰ μὲν τὸ μετόπωρον ἀναμιξ

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such as grey mullet, saupe, red mullet, chalkis. On the so-called pholis the slime that it discharges is plastered all over and becomes like a chamber.

Among the hard-shelled and footless, the scallop moves most and oftenest, flying through its own impulsion; the purpura and those like it move forward to a small extent.

From the strait of Pyrrha the fishes (except goby) swim out in winter because of the cold, for the strait is colder, and swim in again on the arrival of spring. In the strait there occurs neither parrot-wrasse nor thritta nor any other of the more brightly coloured, nor dogfish nor spiny dogfish nor crayfish nor octopus nor bolitaina nor certain others; and of those that grow in the strait the white goby is not a deep-sea fish. Among the fishes the oviparous are at their prime in the spring until they have given birth, but the viviparous in the autumn and in addition to them the grey mullet and red mullet and the others like them. All give birth in the strait, both those of the deep sea and those of the strait: they mate in the autumn and give birth in the spring. In the autumn the selachians too are mixed together,

¹ β γ Ald.: τῇ δὲ καλουμένη φωλίδι α Bk.

² β Guil.: μικρότατον α γ Bk.

³ cett. Guil. Trap. Ald.: ἀκανθηροτέρων L^{rec.sm.} Gaza Bk. Dt.: om. Scot.: ἀνθηρῶν Bas.

⁴ τοιαῦτα. πάντα . . . εὐριπώδη β L^{rec.} Guil. Dt.: τοιαῦτα πάντα. περὶ δὲ τὴν λέσβον καὶ τὰ πελάγια πάντα καὶ τὰ εὐ. α γ Ald. Gaza Bk.

τὰ ἄρρενα τοῖς θήλεσι κατὰ τὴν ὀχείαν, τοῦ δ' ἕαρος εἰσπλέουσι διακεκριμένα μέχρι οὗ ἂν ἐκτέκωσιν· κατὰ δὲ τὴν ὀχείαν ἀλίσκεται πολλὰ συνεζευγμένα.

- τῶν δὲ μαλακίων πανουργότατον μὲν ἡ σηπία
 30 καὶ μόνω¹ χρῆται τῷ θόλῳ κρύψεως χάριν καὶ οὐ μόνον φοβουμένη· ὁ δὲ πολύπους καὶ ἡ τευθὺς διὰ φόβον ἀφίησι τὸν θόλον. ἀφίησι δὲ ταῦτα πάντα οὐδέποτε ἀθρόον τὸν θόλον· καὶ ὅταν ἀφῇ αὐξάνεται πάλιν. ἡ δὲ σηπία, ὥσπερ εἴρηται, τῷ τε θόλῳ χρῆται πολλάκις² κρύψεως χάριν, καὶ
 622a προδείξασα εἰς τὸ πρόσθεν ἀναστρέφεται εἰς τὸν θόλον. ἔτι δὲ θηρεύει τοῖς μακροῖς τοῖς ἀποτείνουσιν οὐ μόνον τὰ μικρὰ τῶν ἰχθυδίων ἀλλὰ καὶ κεστρέας πολλάκις. ὁ δὲ πολύπους ἀνόητον μὲν ἔστι (καὶ γὰρ πρὸς τὴν χεῖρα βαδίζει τοῦ ἀνθρώπου καθιεμένην), οἰκονομικὸς δ' ἔστιν· πάντα
 5 μὲν γὰρ συλλέγει³ εἰς τὴν θαλάμην οὗ τυγχάνει κατοικῶν, ὅταν δὲ καταναλώσῃ τὰ χρησιμώτατα ἐκβάλλει τὰ ὄστρακα καὶ τὰ κελύφια τῶν καρκίνων καὶ κογχυλίων καὶ τὰς ἀκάνθας τῶν ἰχθυδίων· καὶ θηρεύει τοὺς ἰχθῦς τὸ χρῶμα μεταβάλλων καὶ ποιῶν ὅμοιον οἷς ἂν πλησιάζῃ λίθοις. τὸ
 10 δ' αὐτὸ τοῦτο ποιεῖ καὶ φοβηθεῖς. λέγεται δ'

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males with females, at their mating, but in spring they swim in separated until after they have given birth; at the mating many are caught linked together.

Among the cephalopods the cuttlefish has the wickedest tricks and is the only one that uses the ink for concealment and not merely when frightened; the octopus and the teuthis discharge the ink because of fear. None of these ever discharges all the ink at once; and after discharge it increases again. But the cuttlefish, as we have said, often uses the ink for concealment, and after feinting to the front it turns back into the ink. Further, it uses the long extending parts to hunt not only the small fishes but often even grey mullet. The octopus, although stupid (for it even comes towards a man's hand if he puts it under water), is a good house-keeper. For it collects everything into the lair where it happens to live, and after consuming the most useful parts it expels the shells and cases of the crabs and shellfishes and the bones of the small fishes; and it hunts the fishes by changing its colour and making it like whatever stones it is next to. It does the same thing also when frightened. It is said

¹ μόνω A^a G^a Q β L^crec.: μόνη F^a X^c Guil. Trap. Gaza
Sylb. A.-W. Dt.: μόνον C^a γ Ald. Bk.

² πολλ. χρῆ. transp. α γ Ald. Bk.

³ γὰρ συλλ. μὲν transp. α γ Bk.

ὑπό τινων καὶ ὥς¹ ἡ σηπία τοῦτο ποιεῖ· παρόμοιον γάρ φασι τὸ χρῶμα τὸ αὐτῆς ποιεῖν² τῷ τόπῳ περὶ ὃν διατρίβει. τῶν δ' ἰχθύων τοῦτο ποιεῖ μόνον ἡ³ ῥίνη· μεταβάλλει γὰρ τὴν χροάν ὥσπερ ὁ πολύπους.

- 15 τὸ μὲν οὖν πλεῖστον γένος τῶν πολυπόδων οὐ διετίζει· καὶ γὰρ φύσει συντηκτικόν ἐστιν· σημεῖον δ' ἐστίν, πηλούμενος⁴ γὰρ ἀφίησιν αἰεὶ τι καὶ τέλος ἀφανίζεται. αἱ δὲ θήλειαι μετὰ τὸν τόκον τοῦτο πάσχουσι μᾶλλον, καὶ γίνονται μωραί, καὶ οὔτε κυματιζόμεναι αἰσθάνονται λαβεῖν τε τῇ χειρὶ κατακολυμβήσαντα ῥάδιον.
- 20 βλεννώδεις τε γίνονται καὶ οὐδὲ θηρεύουσιν ἔτι προσκαθήμεναι. οἱ δ' ἄρρενες σκυτώδεις τε γίνονται καὶ γλίσχροι. σημεῖον δὲ δοκεῖ εἶναι τοῦ μὴ διετίζειν ὅτι μετὰ τὴν γένεσιν τῶν πολυποδίων ἔν γε τῷ θέρει καὶ πρὸς τὸ φθινόπωρον μέγαν πολύπουν οὐκέτι ῥάδιόν ἐστιν ἰδεῖν, μικρὸν
- 25 δὲ πρὸ τούτου τοῦ καιροῦ μέγιστοί εἰσιν οἱ πολypoδες. ὅταν δὲ τὰ ῥα ἐκτέκωσιν, οὕτω καταγεράσκειν καὶ ἀσθενεῖς γίνεσθαι ἀμφοτέρους φασὶν ὥστε ὑπὸ τῶν ἰχθυδίων κατεσθίεσθαι καὶ ῥαδίως ἀποσπᾶσθαι ἀπὸ τῶν πετρῶν.⁵ πρότερον δὲ τοι-

¹ ὥς καὶ transp. F^a X^c L^c Ald. edd.

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by some also that the cuttlefish does this; for they say it makes its own colour very like the place around which it spends its time. But of the fishes only the angel-fish does this: it changes its colour like the octopus.

Now the majority of the octopus kind do not live through to the next year. For by nature it is colliquescent: a sign of this is that when it is being coated with earth^a it continually loses something and eventually disappears. The females after giving birth are more subject to this, and become stupid, and are not aware of being tossed about in the water but it is easy to dive and catch them by hand; they become slimy and no longer even hunt with diligence. The males become leathery and sticky. Evidence that they do not live through the year seems to be the fact that after the generating of the little octopuses, at any rate in the summer and towards autumn, it is no longer easy to see a big octopus, whereas a little before this time the octopuses are biggest. After laying the eggs, both are said to become so old and weak that they are devoured by the small fishes and easily dragged from their stones, whereas previously nothing like this is done

^a In preparation for cooking.

² τὸ αὐτῆς ποιεῖν β (τὸ αὐτὸ αὐτῆς ποιεῖν T^c) Ald.: ποιεῖν τὸ αὐτῆς α γ Bk. ³ om. α γ (exc. L^{rec.}) Bk.

⁴ πιλούμενος A^a G^arec. Q F^arec. Bk.

⁵ β L^{rec.} Guil. Ott.: φωλεῶν α γ Gaza Ald. Bk.

οὗτον οὐδὲν πάσχειν. ἔτι δὲ τοὺς μικροὺς καὶ
 30 νέους τῶν πολυπόδων μετὰ τὴν γένεσιν οὐδένα¹
 φασὶ τοιοῦτον πάσχειν, ἀλλ' ἰσχυροτέρους εἶναι
 τῶν μειζόνων. οὐ διετίζουσι δ' οὐδ' αἱ σηπταί.
 εἰς δὲ τὸ ξηρὸν ἐξέρχεται μὲν² μόνον τῶν μαλα-
 κίων ὁ πολύπους· πορεύεται δ' ἐπὶ τοῦ τραχέος,
 τὸ δὲ λείον φεύγει. ἔστι δὲ τὰ μὲν ἄλλα ἰσχυρὸν
 τὸ ζῶον, τὸν δὲ τράχηλον ἀσθενὲς ὅταν πιεσθῇ.
 622b περὶ μὲν οὖν τὰ μαλάκια³ τοῦτον ἔχει τὸν
 τρόπον.

τὰς δὲ κογχὰς φασὶ τὰς λεπτὰς καὶ τραχείας
 ποιεῖσθαι περὶ αὐτὰς οἶον θώρακα σκληρόν, καὶ
 τοῦτον μείζονα ὅταν γίνωνται μείζους, καὶ ἐκ
 5 τούτου ἐξιέναι ὥσπερ ἐκ φωλεοῦ τινὸς καὶ⁴ οἰ-
 κίας. ἔστι δὲ καὶ ὁ ναυτίλος πολύπους τῇ τε
 φύσει καὶ οἷς ποιεῖ περιττός· ἐπιπλεῖ γὰρ ἐπὶ τῆς
 θαλάττης, τὴν ἀναφορὰν ποιησάμενος κάτωθεν
 ἐκ τοῦ βυθοῦ, καὶ ἀναφέρεται μὲν κατεστραμ-
 μένῳ τῷ ὀστράκῳ, ἵνα ῥᾶόν γε ἀνέλθῃ καὶ κενῶ
 ναυτίλληται, ἐπιπολάσας δὲ μεταστρέφει. ἔχει
 10 δὲ μεταξὺ τῶν πλεκτανῶν ἐπὶ τι συνυφές, ὅμοιον
 τοῖς στεγανόποσι τὸ μεταξὺ τῶν δακτύλων· πλὴν
 ἐκείνοις μὲν παχύ, τούτοις δὲ λεπτόν τοῦτο καὶ
 ἀραχνῶδές⁵ ἔστιν. χρήται δ' αὐτῷ, ὅταν πνευ-

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to them. And further, as to the small and young octopuses after their birth, they say that none suffers anything like this, but that they are stronger than the bigger ones. The cuttlefish too do not live through the year. The only cephalopod to go out on to dry land is the octopus; it goes along on the rough ground but avoids the smooth. The animal is strong otherwise but weak in the neck when squeezed. This then is the position regarding the cephalopods.

They say that they make the thin and rough mussel-shells into a sort of hard breastplate around themselves, and make this larger when they become larger, and that out of this they emerge as though from some lair and house. The nautilus octopus too is odd both in its nature and in what it does. For it sails on the sea surface having made its ascent from the deep water; it ascends with the shell turned downwards, presumably in order to go up more easily and to steer with it empty, but turns it back again when it has surfaced. Between the tentacles it has webbing up to a certain point, like what the web-footed birds have between the toes, except that in their case it is thick while in these it is thin and cobwebby. It uses it as a sail when there is some

¹ β: οὐθέν α γ Ald. Bk.: θθεν Ppr.

² β γ: om. α L^c Bk.

³ τὰ μαλάκια β γ: τῶν μαλακίων α Bk.

⁴ β: ἡ α γ Ald. Bk.

⁵ β γ Ald.: ἀραχνιώδες α Bk.

μάτιον¹ ἢ, ἰστίω· ἀντὶ πηδαλίων δὲ τῶν πλεκτα-
 νῶν παρακαθήσιν· ἂν δὲ φοβήθῃ, καταδύνει
 15 τῆς θαλάττης μεστῶσας τὸ ὄστρακον. περὶ δὲ
 γενέσεως καὶ αὐξήσεως² τοῦ ὀστράκου ἀκριβῶς
 μὲν οὐπω ᾧπται, δοκεῖ δ' οὐκ ἐξ ὀχείας
 γίνεσθαι ἀλλὰ φύεσθαι ὥσπερ τᾶλλα κογχύλια. οὐ
 δῆλον δέ πω οὐδ' εἰ ἀποδυόμενος δύναται ζῆν.

XXXVIII

τῶν δ' ἐντόμων ζώων ἐργατικώτατα σχεδόν
 20 ἔστι³ καὶ πρὸς τᾶλλα πάντα συγκρίνεσθαι,⁴ τό
 τε τῶν μυρμήκων γένος καὶ τὸ τῶν μελιττῶν,
 ἔτι δ' ἀνθρῖναι⁵ καὶ σφήκες καὶ πάνθ' ὥς εἰπεῖν
 τὰ συγγενῇ τούτοις. εἰσὶ δὲ καὶ τῶν ἀραχνίων οἱ
 γλαφυρώτεροι⁶ καὶ λαγαρώτατοι καὶ τεχνικώ-
 τατοι⁷ περὶ τὸν βίον. ἡ μὲν οὖν τῶν μυρμήκων
 25 ἐργασία πᾶσιν ἔστιν ἐπιπολῆς ἰδεῖν, καὶ ὥς αἰεὶ
 μίαν ἀτραπὸν πάντες βαδίζουσι, καὶ τὴν ἀπό-
 θεσιν τῆς τροφῆς καὶ ταμείαν· ἐργάζονται γὰρ
 καὶ ταῖς νυξὶ⁸ ταῖς πανσελήνοις.⁹

¹ α β L^c rec. Dt.: πνεῦμα τι γ Ald. Bk.

² β: συναυξήσεως α γ Bk.

³ ζώων ... ἔστι β Guil. Ald.: ἐργατικώτατον ζώον (ζώων γ Bk.) ἔστί, σχεδὸν δὲ α γ Bk.

⁴ συγκ. πάντα transp. α γ Ald. Bk.

⁵ β: ἀνθρῆναι α γ Ald. Bk.

⁶ β Gaza: γλαφυρώτατοι α γ Ald. Bk.

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wind; and in place of steering-oars it lets down some of its tentacles alongside. If it is frightened it sinks under water after filling the shell. With regard to its generation and the growth of the shell, no detailed observation has yet been made, but it is thought not to be produced as a result of coition but to grow as the shellfishes^a do too. Nor is it yet clear whether it can live stripped of the shell.

Among the insected animals about the most industrious, and to be compared with all the other animals, are the ant kind and the bee kind, also anthrines and wasps and virtually all that are akin to them. Among the spiders too the smoother^b are the leanest and the most ingenious over their living. Now the working of the ants is on the surface for all to see, and how they all go on one path and put aside and store their food; for they work at night too when there is a full moon. XXXVIII

^a Shellfishes are generated spontaneously, V 15, GA III 11.

^b γλαφυρός may mean either physically or mentally polished — smooth or subtle. It is applied to these spiders several times here. At V 555b11 it has the physical sense, "smooth"; but at 623a8 and 24 it might be either. [Cf., however, I. C. Beavis, *Insects and Other Invertebrates in Classical Antiquity*, Exeter 1988, 34–37.]

⁷ -τεροι α γ Gaza Bk.

⁸ β L^crec. Guil.: τὰς νύκτας α γ edd.: ταῖς νύκταις Ald.

⁹ τὰς πανσελήνους α (exc. C^a) edd.

XXXIX

τῶν δ' ἀράχνιων καὶ τῶν φαλαγγίων ἔστι¹
 πολλὰ γένη, τῶν μὲν δηκτικῶν φαλαγγίων δύο,
 τὸ μὲν ἕτερον ὁμοιον τοῖς καλουμένοις λύκοις,
 30 μικρὸν καὶ ποικίλον καὶ ὀξὺ καὶ πηδητικόν·
 καλεῖται δὲ ψύλλα· τὸ δ' ἕτερον μείζον, τὸ μὲν
 χρῶμα μέλαν, τὰ δὲ σκέλη τὰ πρόσθια μακρὰ
 ἔχον, καὶ τῇ κινήσει νωθρὸν καὶ βαδίζον ἡρέμα
 καὶ οὐ κρατερόν καὶ οὐ πηδῶν. τὰ δ' ἄλλα
 πάντα, ὅσα παρατίθενται οἱ φαρμακοπῶλαι, τὰ
 623a μὲν οὐδεμίαν τὰ δ' ἀσθενῇ ποιεῖ τὴν δῆξιν.
 ἄλλο δ' ἔστι τῶν καλουμένων λύκων γένος.
 τοῦτο μὲν οὖν τὸ μικρὸν οὐχ ὑφαίνει ἀράχνιον, τὸ
 δὲ μείζον παχὺ² καὶ φαῦλον πρὸς τῇ γῇ καὶ ταῖς
 αἱμασιαῖς· ἐπὶ τοῖς στομίοις δ' αἰεὶ ποιεῖ τὸ
 5 ἀράχνιον, καὶ ἔνδον ἔχον τὰς ἀρχὰς τηρεῖ ἕως ἂν
 ἐμπεσόν τι κινήθῃ· ἔπειτα προσέρχεται. τὸ δὲ
 ποικίλον ὑπὸ τοῖς δένδρεσι ποιεῖται μικρὸν καὶ
 φαῦλον ἀράχνιον. ἄλλο δ' ἔστι τρίτον τούτων
 σοφώτατον καὶ γλαφυρώτατον· ὑφαίνει γὰρ
 πρῶτον μὲν διατεῖναν πρὸς τὰ πέρατα πανταχό-
 10 θεν, εἴτα στημονίζεται ἀπὸ τοῦ μέσου (λαμβάνει
 δὲ τὸ μέσον ἱκανῶς), ἐπὶ δὲ τούτοις ὥσπερ κρό-
 κας ἐμβάλλει, εἴτα συνυφαίνει. τὴν μὲν οὖν κοί-
 την καὶ τὴν ἀπόθεσιν τῆς θήρας ἄλλοθι ποιεῖται,

There are many kinds of spiders and phalangia. Of the biting phalangia there are two, one like the so-called wolves which is small, variegated, pointed, good at jumping; it is called a flea; the other is bigger, coloured black, its front legs are long, it is sluggish in movement, walks slowly, is not strong, does not jump. Of all the others that are stocked by the drug-sellers, some have no bite and others a weak one. Another kind is the so-called wolves. Now this small one does not weave a web, while the larger one weaves a thick and poor web on the ground and on the dry-stone walls: it always makes the web over the apertures, but remains inside watching over the starting-threads until something falls in and moves; then it approaches. The variegated one makes for itself a small and poor web under the trees. But there is another, third, kind of these, the most skilful and smoothest. It weaves by first stretching thread to the extremities in every direction, then it lays down the radii from the middle (it takes^a the middle with fair accuracy) and on these lays down the woof, so to speak, and then weaves them together. Now the bed and storage of prey she arranges elsewhere, but she does her hunt-

^a The word used for making a logical postulate, or an approximation in drawing a geometrical figure. Aelian VI 57 remarks that the spider has no need of Euclid.

¹ ἔστι μὲν α γ Ald. Bk.

² β L^crec. Ald.: τραχὺν α γ edd.

- τὴν δὲ θήραν ἐπὶ τοῦ μέσου τηροῦσα· καὶ περὶ
 ὅταν ἐμπέσῃ τι, κινηθέντος τοῦ μέσου πρῶτον
 15 μὲν περιδεῖ καὶ περιελίττει τοῖς ἀραχνίοις ἕως ἂν
 ἀχρεῖον ποιήσῃ, μετὰ δὲ ταῦτ' ἐξήνεγκεν¹ ἀρα-
 μένη, καὶ ἐὰν μὲν τύχῃ πεινώσα, ἐξεχύλισεν
 (αὕτη γὰρ ἡ ἀπόλαυσις), εἰ δὲ μή, πάλιν ὁρμᾷ
 πρὸς τὴν θήραν, ἀκεσαμένη πρῶτον τὸ διερ-
 ρωγός· ἐὰν δέ τι μεταξὺ ἐμπέσῃ, πρῶτον ἐπὶ τὸ
 20 μέσον βαδίζει, κακείθεν ἐπανέρχεται πρὸς τὸ ἐμ-
 πεσὸν ὥσπερ ἀπ' ἀρχῆς. ἐὰν δέ τις λυμήνηται
 τοῦ ἀραχνίου, πάλιν ἄρχεται τῆς ὑφῆς καταφερο-
 μένου τοῦ ἡλίου ἢ ἀνατέλλοντος διὰ τὸ μάλιστα
 ἐν ταύταις ταῖς ὥραις ἐμπίπτειν τὰ θηρία.
 ἐργάζεται δὲ καὶ θηρεύει ἡ θήλεια· ὁ δ' ἄρρην
 συναπολαύει.
- 25 τῶν δ' ἀραχνίων τῶν γλαφυρῶν καὶ ὑφαινόν-
 των ἀράχνιον πυκνὸν δύο γένη ἐστὶ,² τὸ μὲν μεῖ-
 ζον τὸ δ' ἔλαττον. τὸ μὲν οὖν μακροσκελέστερον
 κάτωθεν κρεμάμενον τηρεῖ, ὅπως ἂν μὴ φοβοῦ-
 μενα τὰ θηρία εὐλαβῆται ἀλλ' ἐμπίπτῃ ἄνω (διὰ
 γὰρ τὸ μέγεθος οὐκ εὐκρυφές ἐστι), τὸ δὲ συμμε-
 τρότερον ἄνωθεν ἐπηλυγισάμενον τοῦ ἀραχνίου
 30 ὁπῆν μικράν. δύνανται δ' ἀφίεναι οἱ ἀράχνη τὸ
 ἀράχνιον εὐθὺς γενόμενοι, οὐκ ἔσωθεν ὥς ὃν

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ing at the centre where she keeps watch. Then when something has fallen in and the centre has been moved, first she binds it round and enwraps it with webs until she has made it helpless, then she lifts it up and carries it away, and if she happens to be hungry she sucks out its juice (for that is what she gains from it), but otherwise she sets out on the hunt again, after first mending the broken part. And if anything has fallen in meanwhile, she first goes to the centre, and from there goes back to what has fallen in, just as from the beginning. If anyone damages some of the web, she begins weaving again as the sun is going down or rising, because it is mostly during these times that creatures fall in. The work and hunting is done by the female; the male shares the benefit.

Of the spiders that are smooth and weave a close web there are two kinds, one bigger and one smaller. Now the longer-legged one keeps watch from below by hanging on, so that the creatures may not be frightened and beware but may fall in above it (for because of its size it is not easily hidden); but the better proportioned one keeps watch from above, screening itself in a small hole in the web. The spiders can^a put out web immediately from birth, not

^a If the β reading "cannot" is right, and consistent with V. 555b5, the distinction is between birth and articulation (555a30).

¹ β L^{rec.} Ald.: ἀπένευκεν α Bk.: ἡνευκεν post lac. P: ἡνευκεν E^a K^c M^c L^{pr.} n: effert Guil.

² ἐστὶ γ. trsp. α γ Bk.

περίττωμα, καθάπερ φησὶ Δημόκριτος, ἀλλ' ἀπὸ τοῦ σώματος οἷον φλοιόν, ἢ τὰ βάλλοντα ταῖς θριξίν, οἷον αἱ ὕστριχες. περιτίθεται δὲ καὶ περιελίττεται καὶ τοῖς μείζοσι ζώοις, ἐπεὶ καὶ
 623b ταῖς σαύραις ταῖς μικραῖς ἐπιβάλλον περιτὸ στόμα περιθέον ἀφίησιν ἕως ἂν συλλάβῃ τὸ στόμα· τότε δ' ἤδη δάκνει προσελθόν.

καὶ περὶ μὲν τούτων τῶν ζώων τοῦτον ἔχει τὸν τρόπον.

- XL ἔστι δέ τι γένος τῶν ἐντόμων ὃ ἐνὶ μὲν ὀνό-
 6 ματι ὀμώνυμον¹ ἔστιν, ἔχει δὲ πάντα τὴν μορφήν συγγενικὴν· ἔστι δὲ ταῦτα ὅσα κηριοποιά, οἷον μέλιτται καὶ τὰ παραπλήσια τὴν μορφήν. τούτων δ' ἔστὶ γένη ἐννέα, ὧν τὰ μὲν ἕξ ἀγελαῖα, μέλιττα, [βασιλεῖς τῶν μελιττῶν,]² κηφήν ὃ ἐν
 10 ταῖς μελιτταῖς, σφήξ, ὃ ἐπέτειος, ἔτι δ' ἀνθρίνη³ καὶ τενθρηδών· μοναδικὰ δὲ τρία, σειρὴν ὃ μικρὸς φαλός, ἄλλος⁴ σειρὴν ὃ μείζων ὃ μέλας

¹ codd. cett. Scot. Ald.: ἀνώνυμον G^arec. Q Guil. Trap. Gaza Scal. edd.

² om. codd. cett. Scot. Alb. Guil. Trap.: βασιλεῖς τῶν μελιττῶν L^c Ald. Gaza edd.: post ἐννέα transp. n: βασιλεῖς (om. cet.) O^crec.

³ β γ Ald.: ἀνθρώπη α

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from inside as an excretion as Democritus says, but off the body like tree-bark or like those that shoot out with their hairs, for example porcupines. The spider puts it round even the larger animals and wraps it round them, since it attacks even the small lizards and runs around their mouth discharging web until it has closed the mouth; only then does it approach and bite it.

This then is the position regarding these animals.

There is a particular kind of insects that is designated^a by one name, and all have a form that is akin: these are all that make wax combs, for example bees and those of like form. There are nine kinds of these, six of which are gregarious: bee, [kings of the bees,]^b the bee drone, wasp, the annual one, also anthrine and tenthredon. Solitary are three: the small siren, white; another siren, the

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^a The more likely reading, "unnamed", appears in Guil. and two other Latin translations; in the MSS it occurs only in a later hand (which often relies for its corrections on Guil.) in the 15th cent. MS G^a and in its copy Q.

^b Presumably this addition was intended to make up the number to six gregarious (social) kinds. But other Greek MSS punctuate after *κηφήν*, so implying that there are both bee drones and other drones; however this datum is not found in Arist. except in P and M^c.

⁴ *φαλός*, ἄλλος β P: *φαιός*, ἄλλος α γ Bk.: *φαιοσόλλος* Gpr.: *φαιοσούλλος* G^arec. Q: *φαλός* καὶ ἕτερος τρίτος (punct. supp.) S^c: *φαλός* καὶ ἕτερος L^crec.: *sphaerae, et cirin* Scot.: om. Alb.: *pallidus, alius* Guil.: *fuscusque totus* Trap.: *fuscus totus* Gaza

- καὶ ποικίλος, τρίτος δ' ὁ καλούμενος βομβύλιος
 μέγιστος τούτων. οἱ μὲν οὖν μύρμηκες θηρεύουσι
 μὲν οὐδέν, τὰ δὲ πεποιημένα συλλέγουσιν· οἱ δ'
 15 ἀράχλαι ποιοῦσι μὲν οὐδέν οὐδ' ἀποτίθενται,
 θηρεύουσι δὲ μόνον τὴν τροφήν· τῶν δ' ἐννέα
 γενῶν τῶν εἰρημένων περὶ μὲν τῶν λοιπῶν
 ὕστερον λεχθήσεται, αἱ δὲ μέλιτται θηρεύουσι μὲν
 οὐδέν, αὐταὶ δὲ ποιοῦνται καὶ ἀποτίθενται· ἔστι
 γὰρ αὐταῖς τὸ μέλι τροφή. δῆλον δὲ ποιοῦσιν
 ὅταν τὰ κηρία ἐπιχειρῶσιν οἱ μελιττουργοί¹ ἐξαί-
 20 ρειν·² θυμίωνεσθαι γὰρ καὶ σφόδρα πονοῦσαι ὑπὸ
 τοῦ καπνοῦ τότε μάλιστα τὸ μέλι ἐσθίουσιν, ἐν δὲ
 τῷ ἄλλῳ χρόνῳ οὐ σφόδρα ὀρώνται, ὥς φειδό-
 μεναι καὶ ἀποτιθέμεναι τροφῆς χάριν. ἔστι δ'
 αὐταῖς καὶ ἄλλη τροφή, ἣν καλοῦσί τινες κήριν-
 θον· ἔστι δὲ τοῦτο ὑποδεέστερον καὶ γλυκύτητα
 25 συκώδη ἔχον, κομίζουσι δὲ τοῦτο τοῖς σκέλεσι
 καθάπερ καὶ τὸν κηρόν.

ἔστι δὲ περὶ τὴν ἐργασίαν αὐτῶν καὶ τὸν βίον
 πολλή ποικιλία. ἐπειδὴν γὰρ παραδοθῇ αὐταῖς
 καθαρὸν τὸ σμήνος, οἰκοδομοῦσι τὰ κηρία, φέρου-
 σαι τῶν τ' ἄλλων ἀνθέων καὶ ἀπὸ τῶν δένδρων
 τὰ δάκρυα, ἰτέας τε καὶ πτελέας καὶ ἄλλων τῶν

¹ β E^a: μελιττουργοὶ α γ Bk.

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larger one which is black and variegated; and third the so-called bumble-bee, largest of these. Now the ants hunt nothing, but collect things ready made; the spiders make nothing nor store away, but merely hunt their food; and among the nine kinds that we have mentioned, the rest of which will be spoken of later,^a the bees hunt nothing but produce their food themselves and store it away; for the honey is food for them. They make this clear when the bee-keepers set about lifting the combs; for while they are being fumigated and are suffering severely from the smoke, that is when they chiefly eat the honey, whereas at other times they are not seen doing so to any great extent, appearing to be thrifty with it and to store it away for food. They have another food too, which some call *kerinthos*^b; this is inferior and has a fig-like sweetness; they bring it in on their legs like the wax.

Their working methods and way of life show great complexity. After the hive has been handed over to them clean, they build the wax combs, bringing the drops from the flowers and especially from the trees, from willow and elm and others that are

^a 627b23-629b2.

^b Possibly bee bread, which Arist. in other places calls *erithake* (V 554a17, VIII(IX) 627a22) and *sandarake* (626a7). Pliny XI 7. 17: *erithace* quam aliqui *sandaracam* alii *cerinthum* uocant.

² codd. Ald.: *tollere* Guil. Trap.: *eximere* Gaza: ἐξαιπεῖν edd.

- 30 κολλωδεστάτων. τούτῳ δὲ καὶ τὸ ἔδαφος διαχρί-
 ονσι τῶν ἄλλων θηρίων ἔνεκεν· καλοῦσι δ' οἱ
 μελιττουργοὶ τοῦτο κόνισιν. καὶ τὰς εἰσόδους δὲ
 παροικοδομοῦσιν ἔαν εὐρεῖται ὥσιν. πλάττουσι δὲ
 κηρία πρῶτον ἐν οἷς αὐταὶ¹ γίνονται, εἴτ' ἐν οἷς
 οἱ καλούμενοι βασιλεῖς καὶ τὰ κηφήνια. τὰ μὲν
 624a οὖν αὐτῶν ἀεὶ πλάττουσι, τὰ δὲ τῶν βασιλέων
 ὅταν ᾖ πολυγονία, τὰ δὲ κηφήνια ἔαν μέλιτος
 ἀφθονίαν² ἐπισημαίνῃ. πλάττουσι δὲ τὰ μὲν τῶν
 βασιλέων πρὸς τοῖς αὐτῶν, μικρὰ δ' ἐστὶ ταῦτα,
 τὰ δὲ κηφήνια πρὸς αὐτά· ἐλάττω δ' ἐστὶ ταῦτα
 5 τῷ μεγέθει τῶν μελιττίων. ἄρχονται δὲ τῶν
 ἱστών ἄνωθεν ἀπὸ τῆς ὀροφῆς τοῦ σμήνους καὶ
 κάτω συνυφές,³ ποιοῦσί τε⁴ ἕως τοῦ ἐδάφους
 ἱστοὺς πολλοὺς. αἱ δὲ θυρίδες καὶ αἱ τοῦ μέλιτος
 καὶ τῶν σχαδόνων ἀμφίστομοι· περὶ γὰρ μίαν
 βάσιν δύο θυρίδες εἰσὶν ὥσπερ ἡ τῶν ἀμφικυπέλ-

¹ codd. Ald.: *ipsae* Guil.: *αὐταὶ* edd.

² codd. Ald.: *copia significetur* Guil. Trap.: *copia speratur* Gaza: *ἀφθονία* coni. Sylb. edd.

³ *συνυφές* (*σύνυφες*, *συνηφές*) codd. Ald. Guil. Gaza: *συνυφεῖς* coni. Turnebus edd.

⁴ δὲ E^apr. L^c n Ald.: om. Guil. edd.

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very gummy. With this they also smear the floor against the other creatures; the bee-keepers call this dusting.^a They also build up^b the entrances if they are wide. They fashion first combs in which these bees themselves are produced, then those in which the so-called kings and the drones are produced. Now their own they are always fashioning, those of the kings when there is much production of young, and those of the drones if there are signs that honey is plentiful. They fashion those of the kings next to their own (and these^c are small) and the drones' combs on to them; these are less in size than those of the bees. They begin the webs^d from above, starting from the top of the hive and woven continuously below, and they make many webs down to the floor. The apertures both for the honey and for the grubs have mouths at both ends: for there are two apertures about one base like that of the double

^a The factual reference must be to the smearing of stopwax.

^b That is, narrow.

^c The kings' combs, not their individual cells (which are the biggest); there are few cells for kings (six or seven, V 553b3). Similarly the drones' combs are smaller than the workers', because drones are fewer.

^d ἵστῆς is commonly applied (among other things) to the upright beam of the loom and also to the web itself. It does not denote a honeycomb, but stands for it here metaphorically: as the following lines show, the comb-building is regarded as the weaving of a fabric in which openings are made for cells, not as the building of cell upon cell.

- 10 λων, ἥ μὲν ἐντὸς ἢ δ' ἐκτός. αἱ δὲ περὶ τὰς
 ἀρχὰς τῶν κηρίων πρὸς τὰ σμήνη συνύφναι,¹
 ὅσον ἐπὶ δύο ἢ τρεῖς στίχους κύκλῳ, βραχεῖαι καὶ
 κεναὶ μέλιτος· πληρέστερα δὲ τῶν κηρίων τὰ
 μάλιστα τῷ κηρῷ καταπεπλασμένα. περὶ δὲ τὸ
 στόμα τοῦ σμήνους τὸ μὲν πρῶτον τῆς εἰσδύσεως
 15 περιαλήλιπται μίτυϊ· τοῦτο δ' ἐστὶ μέλαν ἱκα-
 νῶς, ὥσπερ ἀποκάθαρμ' αὐταῖς τοῦ κηροῦ, καὶ
 τὴν ὁσμὴν δριμύ, φάρμακον δ' ἐστὶ τυμμάτων
 καὶ τῶν τοιούτων ἐμπυημάτων· ἡ δὲ συνεχὴς
 ἀλοιφή τούτῳ πισσόκηρος, ἀμβλύτερον καὶ ἥττον
 φαρμακῶδες τῆς μίτυος.

- λέγουσι δέ τινες τοὺς κηφήνας κηρία μὲν
 20 πλάττειν καθ' αὐτοὺς καὶ ἐν τῷ αὐτῷ σμήνει καὶ
 ἐν τῷ ἐνὶ κηρίῳ μεριζομένους πρὸς τὰς μελίττας,
 μελιτουργεῖν μέντοι οὐθὲν ἀλλὰ τρέφεσθαι τὸ²

¹ β Ald.: συνυφέϊαι C^a γ Bk.: συνηφέϊαι α

² β γ Ald.: τῷ α Bk.

^a For the comparison to be possible, the amphotropos must have been shaped like an hour-glass, having a cup both top and bottom. The honeycomb cells are of course on their sides, so that the observer looking from one side sees one cup pointing towards him "outside" and the other pointing away "inside". (Both are tilted upwards to keep

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cups,^a one aperture inside and one outside. The weavings^b attached to the hives around the beginnings of the combs, as far as two or three rows in a circle, are shallow and empty of honey; the fuller combs are those that have been most thoroughly plastered with wax. About the mouth of the hive the first part of the entrance-way is smeared over with mitys; this has a fairly dark colour and is a sort of off-scouring that they get from the wax, with a sharp smell; it is a remedy for stings and similar suppurations. The smearing that is next to this is pissoceros, a blander and less medicinal stuff than the mitys.^c

Some say that the drones fashion combs by themselves both in the same hive and in the one comb (by dividing it with the bees), but that they make no honey but both they and the young feed on that of

the contents in.) Although the ampicupellus is known from Homer (*Il.* 1. 584, *Od.* 3. 63), its shape was already disputed in ancient times. Aristarchus *Et. M.* 90. 43 explained it as two-handled like the two-eared cup of Hom. *Od.* 22. 10, and was followed by Schliemann; Athen. XI 783B quotes other possible meanings. "That of the double cups" refers to the base; the expression is awkward; the version quoted by Eustath. 159. 1 omits $\frac{1}{2}$ and therefore means "those of the double cups", i.e. the apertures.

^b The comb-constructions, cf. 624a5 note.

^c Pissoceros and mitys are evidently varieties of bee-glue (modern 'propolis'), which is not in fact wax but a gum collected from trees such as horse-chestnut and used by the bees to stop up cracks.

τῶν μελιττῶν καὶ αὐτοὺς καὶ τοὺς νεοττοὺς.
 διατρίβουσι δ' οἱ κηφήνες τὰ μὲν πολλὰ ἔνδον,
 εἰάν δ' ἐκπετασθῶσι προσφέρονται ῥύβδην ἄνω
 25 πρὸς τὸν οὐρανόν, ἐπιδινοῦντες αὐτοὺς καὶ ὥσπερ
 ἀπογυμνάζοντες· ὅταν δὲ τοῦτο δράσωσι, πάλιν
 εἰσελθόντες εὐωχοῦνται. οἱ δὲ βασιλεῖς οὐ πέτον-
 ται ἔξω, εἰάν μὴ μετὰ ὅλου τοῦ ἔσμου, οὔτ' ἐπὶ
 βοσκὴν οὔτ' ἄλλως. φασὶ δὲ καὶ εἰάν ἀποπλα-
 νηθῇ ὁ ἀφεσμός, ἀνιχνεύουσας μεταθεῖν ἕως ἂν
 εὕρωσι τὸν ἡγεμόνα τῇ ὁσμῇ. λέγεται δὲ καὶ
 30 φέρεσθαι αὐτὴν¹ ὑπὸ τοῦ ἔσμου ὅταν πέτεσθαι μὴ
 δύνηται· καὶ εἰάν ἀπόλληται,² ἀπόλλυσθαι τὸν
 ἀφεσμόν· εἰάν δ' ἄρα χρόνον τινὰ διαμείνωσι καὶ
 κηρία οὐ³ ποιήσωσι, μέλι οὐκ ἐγγίνεσθαι καὶ
 αὐτὰς ταχὺ ἀπόλλυσθαι.

τὸν δὲ κηρὸν ἀναλαμβάνουσιν αἱ μέλισσαι
 ἀριχώμεναι πρὸς τὰ βρύα ὀξέως πρὸς⁴ τοῖς ἔμ-
 624b προσθεν ποσί· τούτους δ' ἐκμάττουσιν εἰς τοὺς
 μέσους, τοὺς δὲ μέσους εἰς τὰ βλαισὰ τῶν
 ὀπισθίων· καὶ οὕτω χωσθεῖσαι⁵ ἀποπέτονται, καὶ

¹ β E^a K^c: αὐτὸν α O^crec. P M^c Bk.

² A^a β: ἀπόλληται C^a γ Bk.: ἀπόλλυται G^a Q F^a X^c n Ald.

³ β L^crec. Ald.: om. α O^crec. γ Bk.

⁴ om. α γ (exc. L^crec.) Bk.

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the bees. The drones spend most of the time within, but if they fly out they are borne up in a mass to the sky, whirling around and apparently exercising themselves; after doing this they come back inside and feast. But the kings do not fly out except with the whole swarm, neither for foraging nor for anything else. They say too that if the swarm^a has strayed they turn back, tracking the leader by scent until they find him. It is said that he is even carried by the swarm when he is unable to fly, and that if he perishes the swarm perishes; and that if they do survive for some time and make no combs, no honey is produced and the bees soon perish.

The bees pick up the wax by scrabbling at the blossoms busily with their front feet; these they wipe off onto the middle feet, and the middle ones on to the bent parts of the hind ones; having done this they fly away carrying the load, and are clearly

^a Aelian V 10 has "when the king deserts them", and Gaza has *rex ipse* instead of the swarm. Dt. deletes "the swarm"; A.-W. suggest reading "if he wanders away from the swarm". Factually, Aelian's version is more probable; perhaps "the swarm" is an unlucky gloss which should be deleted.

⁵ β L^crec.: γεμισθεῖσαι a edd.: ἀχθεθεῖσαι O^crec.: lac. σθεῖσαι E^a P K^c: σκευασθεῖσαι (ut vid.) M^c: βιασθεῖσαι L^cpr. n Ald.: coxas Scot.: sarcinate Guil.: graves Trap.: onustae Gaza

δῆλαι δέ¹ εἰσι βαρυνόμεναι. καθ' ἐκάστην δὲ
 πτῆσιν οὐ βαδίζει ἢ μέλιττα ἐφ' ἕτερα τῷ εἶδει
 5 ἄνθη, οἷον ἀπὸ ἴου ἐπὶ ἴον, καὶ οὐ θιγγάνει ἄλλου
 γε, ἕως ἂν εἰς τὸ σμῆνος εἰσπετασθῇ. ὅταν δ'
 εἰς τὸ σμῆνος ἀφίκωνται ἀποσειόνται, καὶ παρ-
 ακολουθοῦσιν ἐκάστη τρεῖς ἢ τέτταρες. τὸ δὲ
 λαμβανόμενον οὐ ῥαδίον ἐστὶν ἰδεῖν· ἡ² τὴν
 ἐργασίαν τίνα³ τρόπον ποιοῦνται, οὐκ ὥπται·
 10 τοῦ δὲ κηροῦ ἢ ἀνάληψις τεθεώρηται ἐπὶ τῶν
 ἐλαιῶν, διὰ πυκνότητα τῶν φύλλων ἐν ταύτῳ
 διαμενουσῶν πλείω χρόνον.

μετὰ δὲ τοῦτο νεοττεύουσιν. οὐθὲν δὲ κωλύει
 ἐν τῷ αὐτῷ κηρῷ⁴ εἶναι νεοττοὺς καὶ μέλι καὶ
 κηφῆνας. ἐὰν μὲν οὖν ὁ ἡγεμὼν ζῇ, χωρὶς φασὶ
 τοὺς κηφῆνας γίνεσθαι, εἰ δὲ μὴ, ἐν τοῖς τῶν
 15 μελιττῶν κυττάροις γεννᾶσθαι ὑπὸ τῶν μελιτ-
 τῶν, καὶ γίνεσθαι τούτους θυμωτέρους· διὸ καὶ

¹ β L^c rec. Ald.: om. α γ Bk.

² ἡ β: οὐδὲ G^a Q γ Ald. edd.: οὐ δὲ α neque Guil.

³ β: ἡ τίνα α γ: ὄντινα L^c Ald. edd.

⁴ κηρῷ C^a β γ Ald.: καιρῷ α: cera Scot.: domo Alb.: favo Guil.: tempore Trap.: cella Gaza: κηρίῳ coni. Casaub. edd.

^a ἀποσειέσθαι commonly takes an object and means to shake the object off; so Scot. Guil. Trap. (and apparently Pliny XI 10.22) interpret it here as shaking off the load of wax. But in the only other passage where Arist. uses the

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weighed down. On each flight the bee does not go on to flowers different in form; it goes for example from violet to violet, and does not touch any other before it has flown back to the hive. And having arrived at the hive they shake themselves,^a and three or four bees attend to each. What they pick up is not easy to see, nor has their method of working it been seen; but the collecting of the wax has been observed on olive trees, since owing to the leaves' density the bees remain in the same place for longer.

After this they nest. Nothing prevents there being grubs and honey and drones in the same wax.^b Now if the leader is alive, they say that the drones are produced apart, but that otherwise they are generated in the bees' cells by the bees, and that these drones become more spirited; and for this reason

word, it means "shake oneself" (V 560b8), and so Gaza translates it here "se quatiunt". It has aroused interest because it seems to anticipate von Frisch's 'dance of the bees', the waggle by which bees are thought to report the direction and distance of forage: see W. K. Kraak, "First attempts at animal ethology in Greek biology", *Actes du VII^e congrès d'hist. des sciences*, Paris 1953, and J. B. S. Haldane in *JHS* 75 (1955) p. 24. Doubt is expressed, however, by B. G. Whitfield, *CR* 8 (1958) p. 14, though he allows that "the actual movements on which von Frisch relies were noticed by the author of H.A. IX". (Whitfield's other comments are vitiated by inadequate information about the text.)

^b That is, comb; hence Casaubon's conjecture.

καλείσθαι κεντρωτούς, οὐκ ἔχοντας¹ ἀλλ' ὅτι
 βούλονται μὲν οὐ δύνανται δὲ βάλλειν. εἰσὶ δὲ
 μείζους οἱ τῶν κηφήνων κύτταροι. ἀναπλάτ-
 τουσι δὲ ὅτε μὲν καὶ αὐτὰ καθ' αὐτὰ τὰ κηρία τὰ
 20 τῶν κηφήνων, ὥς ἐπὶ τὸ πολὺ δ' ἐν τοῖς τῶν
 μελιττῶν· διὸ καὶ ἀποτέμνουσιν.

εἰσὶ δὲ γένη τῶν μελιττῶν πλείω, καθάπερ
 εἴρηται πρότερον, δύο μὲν ἡγεμόνων, ὁ μὲν βελ-
 τίων πυρρός, ὁ δ' ἕτερος μέλας καὶ ποικιλώτερος,
 τὸ δὲ μέγεθος διπλάσιος τῆς χρηστῆς μελίττης·
 ἢ δ' ἀρίστη μικρά, στρογγύλη καὶ ποικίλη, ἄλλη
 25 μακρά, ὁμοία τῇ ἀνθρίνῃ.² ἕτερος ὁ φῶρ καλού-
 μενος, μέλας πλατυγάστωρ. ἔτι δ' ὁ κήφην·
 οὗτος μέγιστος πάντων, ἄκεντρος δὲ καὶ νωθρός.
 διαφέρουσι δ' αἱ γινόμεναι τῶν μελιττῶν αἷ τ'
 ἀπὸ τῶν τὰ ἡμέρα νεμομένων καὶ ἀπὸ τῶν τὰ
 ὄρεινά· εἰσὶ γὰρ αἱ ἀπὸ τῶν ὑλονόμων δασύτεραι
 30 καὶ ἐλάττους καὶ ἐργατικώτεραι καὶ χαλεπώ-
 τεραι. αἱ μὲν οὖν χρησταὶ μέλιτται ἐργάζονται
 τὰ τε κηρία ὁμαλὰ καὶ τὸ ἐπιπολῆς κάλυμμα
 πᾶν λεῖον, ἔστι³ δ' ἐν εἶδος τοῦ κηρίου, οἶον
 ἅπαν μέλι ἢ νεοττοὺς ἢ κηφήνας· ἂν δὲ συμβῇ
 ὥστ' ἐν τῷ αὐτῷ κηρίῳ ἅπαντα ποιεῖν αὐτά,

¹ ἔχ. κέντρον coni. Bas. Bk.: quamvis aculeo careant
 Gaza

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they are even called drones with stings, not because they have them but because they wish to strike but cannot. The drones' cells are larger. Sometimes they fashion the drones' combs separately by themselves, but as a rule among those of the bees; that is why one cuts them out.

There are several kinds of bees, as we have said before^a: two of leaders, the better one red, the other black and more variegated and twice the size of the good working bee. The best bee is small, round and variegated; another is long, resembling the anthrine. A different one is the so-called robber, black and broad-bellied. Further, the drone; this is the biggest of all, but stingless and sluggish. There is a difference between the bees produced from those that forage in domesticated plants and the bees produced from those foraging in the mountain plants; for those from the forest-foragers are hairier and smaller and more industrious and fiercer. Now the good working bees work to make the combs even, with the outer covering all smooth; and there is one form of the comb, for example all honey or grubs or drones; but if it happens that they make all of them in the same comb, there will be continuously one

^a V 553a25-27, b7-11, repeated here verbatim.

² ἀνθρίνη β γ Ald.: ἀρθρήνη α (exc. F^a X^c): ἀνθρήνη Bk.

³ codd. Guil. Ald.: ζτ Bas. edd.

ἔσται ἐφεξῆς ἐν εἶδος εἰργασμένον δι' ἀντλίας.
 625a αἱ δὲ μακραί¹ τὰ τε κηρία ποιοῦσιν ἀνώμαλα καὶ
 τὸ κάλυμμα ἀνωδηκός, ὅμοιον τῷ τῆς ἀνθρήνης,²
 ἔτι δὲ τὸν γόνον καὶ τὰλλα τεταγμένα ὡς³ ἀν
 τύχη· γίνονται δ' ἐξ αὐτῶν οἳ τε πονηροὶ ἡγεμό-
 5 νες καὶ κηφῆνες πολλοὶ καὶ οἱ φῶρες καλούμενοι,
 μέλι δὲ⁴ πάνυ βραχὺ ἢ οὐδέν.

ἐπικάθηνται δ' ἐπὶ⁵ τοῖς κηρίοις αἱ μέλιτται
 καὶ συμπέττουσιν· ἐὰν δὲ τοῦτο μὴ ποιῶσι, φθεί-
 ρεσθαὶ φασὶ τὰ κηρία καὶ ἀραχνιοῦσθαι. καὶ ἐὰν
 μὲν τὸ λοιπὸν δύνωνται κατέχειν ἐπικαθήμεναι,
 τοῦθ' ὥσπερ ἑκβρωμα γίνεται, εἰ δὲ μή, ἀπόλλυ-
 10 ται⁶ ὅλα. γίνεται δὲ σκωλήκια ἐν τοῖς φθειρομέ-
 νοις, ἃ πτερούμενα ἐκπέταται. καὶ τὰ πίπτοντα
 δὲ τῶν κηρίων ὀρθοῦσιν αἱ μέλιτται, καὶ ὑφιστᾶ-
 σιν ἐρείσματα ὅπως⁷ δύνωνται ὑπιέναι· ὅταν γὰρ
 μὴ ἔχωσιν ὁδὸν ἢ προσπορεύσονται,⁸ οὐ προσκα-
 θίζουσιν, εἴτ' ἀραχνιοῦται.

15 τοῦ δὲ φωρὸς καὶ κηφῆνος γενομένων οὐδέν
 ἔστιν ἔργον, τὰ δὲ τῶν ἄλλων βλάπτουσιν. ἅλι-

¹ μικραί β (exc. O^crec.) L^c Ald. [See Introd. p. 38 note.]

² ἀνθρήνης β L^c Ald.: ἀρθρήνης n

³ τὰλλα οὐ τεταγμένα ἀλλ' ὡς L^cpr. Gaza Ald. Bk.

⁴ δὴ C^a A^a G^a Q, E^a K^c M^c: δ' ἢ Bk. Dt.

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form constructed through a mixed heap.^a But the long bees make the combs uneven and the cover bulging like that of the anthrene, and moreover the embryos and everything else placed at random. From them come the bad leaders and many drones and the so-called robbers, but very little or no honey.

The bees sit over the combs and concoct them; if they do not do this the combs are said to perish and become cobwebby.^b And if they can save the rest of the comb by sitting over it, this bad part becomes like a piece eaten away; otherwise whole combs are destroyed. In the corrupted parts small grubs are produced which grow wings and fly away. Further, the bees set right the combs that are falling, and put props under them so that they can pass underneath; for when they have no way of approach they do not sit on them and then they become cobwebby.

The robber and drone, once produced, do not work but damage the work of the others; and when

^a ἀντλία properly means the hold or bilge of a ship, then bilge-water, then metaphorically any impure mixture (cf. Nicander *Ther.* 114, 546), which is probably the sense here: the comb presents a uniform and smooth appearance in spite of being a mixture of different types of cell; the bees achieve this by smoothing and levelling the outer covering. ^bCf. VII(VIII) 605b10, VIII(IX) 626b18.

⁵ ἐν β L^c rec.

⁶ ἀπόλλυνται β L^c n Ald. ⁷ ὅπως ἀν α Bk.

⁸ προσπορεύονται β L^c Ald.

σκόμενοι δὲ θνήσκουσιν ὑπὸ τῶν χρηστῶν μελι-
 τῶν. κτείνουσι δ' αὖται σφόδρα καὶ τῶν ἡγεμό-
 νων τοὺς πολλούς, καὶ μᾶλλον τοὺς πονηρούς,
 ἵνα μὴ πολλοὶ ὄντες διασπῶσι τὸν ἔσμόν. κτεί-
 νουσι δὲ μάλιστα ὅταν μὴ πολύγονον ᾖ τὸ
 20 σμήνος μηδὲ ἀφέσεις μέλλωσι γίνεσθαι· ἐν γὰρ
 τούτοις τοῖς καιροῖς καὶ τὰ κηρία διαφθείρουσι τὰ
 τῶν βασιλέων, ἐὰν ᾖ παρεσκευασμένα, ὥς ἐξ-
 αγωγέων ὄντων. διαφθείρουσι δὲ καὶ τὰ τῶν
 κηφήνων ἐὰν ὑποφαίνῃ¹ ἀπορία μέλιτος καὶ μὴ
 εὐμελιτῇ τὰ σμήνη· καὶ τοῖς ἐξαίρουσι² περὶ τοῦ
 25 μέλιτος τότε μάχονται μάλιστα, καὶ τοὺς ὑπάρ-
 χοντας τῶν κηφήνων ἐκβάλλουσι, καὶ πολλάκις
 ὁρῶνται ἐν τῷ τεύχει ἀποκαθήμεναι. πολεμοῦσι
 δὲ σφόδρα αἱ μικραὶ τῷ γένει τῷ μακρῷ καὶ πει-
 ρῶνται ἐκβάλλειν ἐκ τῶν σμηνῶν· καὶ ἐπικρα-
 τήσωσι, τοῦτο δοκεῖ ὑπερβολῇ γίνεσθαι³ ἀγαθόν
 30 σμήνος. αἱ δ' ἕτεραι ἂν γένωνται αὐταὶ ἐφ' ἑαυ-
 τῶν, ἀργοῦσί τε καὶ τελέως οὐθὲν ποιοῦσιν ἀγα-
 θόν, ἀπόλλυνται δὲ καὶ αὐταὶ πρὸ τοῦ φθινοπώ-
 ρου. ὅσας δὲ κτείνουσιν αἱ χρησταὶ μέλιται,
 πειρῶνται μὲν ἔξω τοῦ σμήνους τοῦτο πράττειν·
 ἐὰν δ' ἔσω τις ἀποθάνῃ, ἐξάγουσιν ὁμοίως. οἱ δὲ
 625b φῶρες καλούμενοι κακουργοῦσι μὲν καὶ τὰ παρ'

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caught they are killed by the good working bees. The latter also readily kill the majority of the leaders, especially the bad ones, so that there should not be a multiplicity of them to disperse the swarm. They kill them mostly when the hive is not producing many young and when no swarming is about to happen; at these times they destroy even the combs of the kings, if they have been prepared, because kings lead the swarms out. They destroy the drones' combs too if there are signs of a shortage of honey and the hives are not well stocked with honey; and it is then that they fight most over the honey against those who take it, and expel the drones that are present, and are often seen sitting out on the hive-stand. The small bees are very hostile to the long kind and try to expel them from the hives; and if they defeat them, this is believed to become an extremely good hive. But if the others are left in charge of themselves they idle and achieve nothing good but actually die themselves before the autumn. Whenever the working bees kill, they try to do it outside the hive; and if one dies inside they take it out likewise. The so-called robbers not only damage

¹ ὑποφαίνη] ἢ β L^c rec.: ὑποφαίνηται L^c pr. Ald.

² ἐξαιροῦσι C^a Bk. Dt.

³ C^a S^c E^a L^c n Ald. edd.: ὑπερβολή γγ. β P K^c M^c: ὑπερβα-
λέσθαι α: ὑπερβάλλεσθαι Ott.

αὐτοῖς κηρία, εἰσέρχονται δὲ ἔαν λάθωσι καὶ εἰς τὰ ἀλλότρια· ἔαν δὲ ληφθῶσι,¹ θνήσκουσιν. ἔργον δ' ἐστὶ λαθεῖν· ἐπὶ τε γὰρ εἰσόδῳ ἐκάστη φύλακές εἰσιν, αὐτός τε ἔαν εἰσελθὼν λάθῃ, διὰ
 5 τὸ ὑπερπεπληῆσθαι² οὐ δύναται πέτεσθαι ἀλλὰ πρὸ τοῦ σμήνου κυλίνεται, ὥστ' ἔργον ἐστὶν αὐτῷ ἐκφυγεῖν.

οἱ δὲ βασιλεῖς αὐτοὶ μὲν οὐχ ὁρῶνται ἔξω ἄλλως ἢ μετ' ἀφέσεως· ἐν δὲ ταῖς ἀφέσεσιν αἱ λοιπαὶ περὶ τοῦτον συνεσπειραμέναι φαίνονται. ὅταν δ' ἄφεις μέλλῃ γίνεσθαι, φωνὴ μονῶτις
 10 καὶ ἴδιος γίνεται ἐπὶ τινος ἡμέρας, καὶ πρὸ δύο ἢ τριῶν ἡμερῶν ὀλίγαι πέτονται περὶ τὸ σμῆνος· εἰ δὲ γίνεται καὶ ὁ βασιλεὺς ἐν ταύταις οὐκ ὥπται οὐπω³ διὰ τὸ μὴ ῥάδιον εἶναι. ὅταν δ' ἀθροισθῶσιν, ἀποπέτονται καὶ χωρίζονται καθ' ἕκαστον τῶν βασιλέων αἱ ἄλλαι· ἔαν δὲ τύχωσιν ὀλίγαι πολλαῖς ἐγγὺς καθεζόμεναι, μετανίσταν-
 15 ται αἱ ὀλίγαι πρὸς τὰς πολλὰς, καὶ τὸν βασιλέα ὃν ἀπέλιπον, ἔαν συνακολουθήσῃ, διαφθείρουσιν. τὰ μὲν οὖν περὶ τὴν ἀπόλειψιν καὶ ἄφεισιν τοῦτον συμβαίνει γίνεσθαι τὸν τρόπον.

εἰσὶ δ' αὐταῖς τεταγμέναι ἕφ' ἕκαστον τῶν ἔργων, οἷον αἱ μὲν ἀνθοφοροῦσιν, αἱ δ' ὑδροφο-

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the combs in their own hives but also enter those of others if they are not detected; if caught, they are killed. It is difficult for them to escape detection, for not only are there guards at every entrance but the robber himself, if he has got in undetected, through over-filling himself is unable to fly but rolls about in front of the hive so that it is difficult for him to escape.

The kings are not themselves seen outside except in the company of a swarm, and in the swarms the other bees are seen to be in close order around the king. When a swarm is about to take flight, a monotonous and peculiar hum is made for some days, and two or three days beforehand a few bees fly round the hive; whether the king is also among these has not yet been observed because it is not easy. When they have all collected, they fly off and the ordinary bees divide up around each of the kings; but if a small group happens to settle near a large group, the small group changes its place to join the large one, and if the king whom they have abandoned accompanies them they destroy him. Such then are the events surrounding the departure and swarming.

They have bees appointed to each of the tasks, for example some are flower-gatherers, others are

¹ ληφθῶσι εἰς τὰ ἀλλότρια β γ Ald.

² ὑπερπλησθῆναι β L^c rec.: ὑπερπλησθαι n: ὑπερπεπλεῖσθαι Ald.

³ πω L^c n Ald. edd.

- 20 ροῦσιν, αἱ δὲ λεαίνουσι καὶ κατορθοῦσι τὰ κηρία.
 φέρει δ' ὕδωρ ὅταν τεκνοτροφῇ. πρὸς σάρκα δ'
 οὐθενὸς καθίζει οὐδ' ὀψοφαγεῖ. χρόνος δ' αὐταῖς
 οὐκ ἔστιν εἰθισμένος ἀφ' ὅτου ἄρχονται ἐργάζε-
 σθαι· ἀλλ' ἐὰν τὰ πιτήδεια ἔχωσι καὶ εὖ
 διάγωσι,¹ μᾶλλον ἐν ὥρᾳ τοῦ ἔτους ἐγχειροῦσι τῇ
 ἐργασίᾳ, καὶ ὅταν εὐδία ᾗ συνεχῶς ἐργάζονται.
 25 καὶ εὐθύς δὲ νέα οὔσα ὅταν ἐκδύῃ ἐργάζεται τρι-
 ταία, ἐὰν ἔχῃ τροφήν. καὶ ὅταν ἐσμός προκάθη-
 ται, ἀποτρέπονται² ἔνιαι ἐπὶ τροφήν, εἴτ'
 ἐπανέρχονται πάλιν.

- ἐν δὲ τοῖς εὐθηνοῦσι τῶν σμηνῶν ἐκλείπει ὁ
 γόνος τῶν μελιττῶν περὶ τετταράκονθ' ἡμέρας
 30 μόνον τὰς μετὰ χειμερινὰς τροπὰς. ἐπειδὰν δ'
 ἠϋξημένοι ᾧσιν οἱ νεοττοί, τροφήν αὐτοῖς παρα-
 θεῖσαι καταχρίουσιν.³ ὅταν δ' ᾗ δυνατός, αὐτὸς
 διελὼν τὸ κάλυμμα ἐξέρχεται. τὰ δὲ γινόμενα
 θηρία ἐν τοῖς σμήνεσι καὶ λυμαινόμενα τὰ κηρία
 αἱ μὲν χρησταὶ μέλιτται ἐκκαθαίρουσιν, αἱ δ'
 626a ἕτεραι διὰ κακίαν περιορῶσιν ἀπολλύμενα τὰ
 ἔργα. ὅταν δὲ τὰ κηρία ἐξαίρωσιν⁴ οἱ μελιττουρ-
 γοί, ἀπολείπουσιν αὐταῖς τροφήν διὰ χειμῶνος,⁵

¹ εὖ διάγωσι α γ (διάγουσι P K^c) Guil. Gaza Ald. Bk.: εὐδία
 ᾧσι β L^crec. ² ἀποπέτονται β: ἀποπέπτονται Ott.

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water-gatherers, and others smooth and level the combs. They bring water when they are rearing young. They do not settle on any animal flesh nor eat cooked food. There is no customary time for them to begin work, but if they have their needs provided and are in good condition, it tends to be in the height of spring that they set to work, and when the weather is fine they work continuously. Moreover a bee newly produced works straightaway on the third day after shedding its case, if it has food. And when a swarm has taken up its position, some detach themselves to go for food, and then come back to them again.

In hives that are thriving the production of embryo bees lapses for only about the forty days after the winter solstice. When the young have grown, they put food by them and smear a coating over; the grub itself, when it is able, splits the covering and comes out. The creatures that develop in the hives and damage the combs are cleaned out by the good working bees, but the other bees because of their bad character look on unconcerned at the destruction of the work. When the bee-keepers are lifting the combs they leave food for the bees through

³ κατακλείουσιν β L^crec. : καταχρελουσιν E^apr. Ppr. K^c

⁴ codd.: ἐξαιρῶσιν edd.: auferant Guil.

⁵ χειμῶνα β L^c Ald.

ἢ¹ ἂν μὲν διαρκῆς ᾗ, σώζεται τὸ σμήνος, εἰ δὲ
 μή, ἂν μὲν χειμῶν ᾗ, αὐτοῦ θνήσκουσιν, εὐδιῶν
 5 δ' οὐσῶν ἐκλείπουνσι τὸ σμήνος. τροφῇ δὲ χρῶν-
 ται μέλιτι καὶ θέρους καὶ χειμῶνος· τίθενται δὲ
 καὶ ἄλλην τροφὴν ἐμφερῇ τῷ κηρῷ τὴν σκληρό-
 τητα, ἣν ὀνομάζουσί τινες σανδαράκην.

ἀδικοῦσι δ' αὐτὰς μάλιστα οἱ τε σφήκες καὶ οἱ
 αἰγίθαλοι καλούμενοι τὰ ὄρνεα, ἔτι δὲ χελιδῶν
 καὶ μέροψ. θηρεύουσι δὲ καὶ οἱ τελματιαῖοι
 10 βάτραχοι πρὸς τὸ ὕδωρ αὐτὰς ἀπαντώσας·
 διόπερ καὶ τούτους οἱ μελισσῆς ἐκ τῶν τελμάτων
 ἀφ' ὧν ὑδρεύονται αἱ μέλιτται θηρεύουσι, καὶ τὰς
 σφηκίας καὶ τὰς χελιδόνας τὰς πλησίον τῶν
 σμηνῶν ἐξαίρουσι² καὶ τὰς τῶν μερόπων νεοτ-
 τείας. οὐδὲν δὲ φεύγουσι τῶν ζώων ἄλλ' ἢ
 15 ἑαυτάς. ἡ δὲ μάχη αὐτῶν ἐστὶ καὶ πρὸς ἑαυτάς
 καὶ πρὸς τοὺς σφήκας. καὶ ἔξω μὲν οὔτε ἀλλή-
 λας ἀδικοῦσιν οὔτε τῶν ἄλλων οὐθέν, τὰ³ δὲ
 πρὸς τῷ σμήνει ἀποκτείνουσιν ὧν ἂν κρατή-
 σωσιν. αἱ δὲ τύπτουσai ἀπόλλυνται διὰ τὸ μὴ
 δύνασθαι τὸ κέντρον ἄνευ τοῦ ἐντέρου ἐξαιρεῖ-
 σθαι· πολλάκις γὰρ σώζεται ἂν ὁ πληγεὶς ἐπι-
 20 μελῇται καὶ τὸ κέντρον ἐκθλίβῃ· τὸ δὲ κέντρον

¹ καὶ β

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the winter, and if it lasts out the hive is preserved, but otherwise if there is wintry weather they die there and if there are fine spells they desert the hive. For food they use honey both in summer and in winter; but they also store another food resembling wax in its hardness, which some name sandarake.^a

Bees are attacked most by wasps and by the birds called titmice, also by swallow and bee-eater. They are hunted also by the marsh frogs which they encounter when they go to the water; for this reason the frogs too are hunted by the bee-keepers out of the marshes from which the bees get water; the keepers also remove the wasps' nests and the swallows that are near the hives and the bee-eaters' nests. Bees flee from no animals except each other. Their fighting is both against themselves and against the wasps. Outside they attack neither each other nor any other animal, but beside the hive they kill any that they overcome. Those that sting perish because the sting cannot be removed without the intestine; for often the bee is saved if the person stung takes care and squeezes out the sting; but in

^a Sandarake usually means realgar; cf. VII(VIII) 604b28. Here it seems to mean bee-bread, which is called erithake at V 534a17, VIII(IX) 627a22 and kerinthos at 623b23 (see note there; cf. also Pliny XI 14. 35).

² codd.: ἐξαίρουσι edd.: *auferunt* Guil.

³ τὰς β L^crec.

ἀποβάλλουσα¹ ἢ μέλιττα ἀποθνήσκει. κτείνουσι
 δὲ βάλλουσαι τὰ μεγάλα τῶν ζώων, οἷον² ἵππος
 ἤδη ἀπέθανεν ὑπὸ μελιττῶν. ἥκιστα δὲ χαλε-
 παίνουσιν οἱ ἡγεμόνες καὶ τύπτουσιν.

τὰς δ' ἀποθνησκούσας τῶν μελιττῶν ἐκκομί-
 25 ζουσιν ἔξω. καὶ τᾶλλα δὲ καθαριώτατόν ἐστι τὸ
 ζῶον· διὸ καὶ τὸ περίττωμα πολλάκις ἀφιασιν
 ἀποπετόμεναι διὰ τὸ δυσώδες εἶναι. δυσχεραί-
 νουσι δ' ὥσπερ εἴρηται ταῖς δυσώδεσιν ὁσμαῖς
 καὶ ταῖς τῶν μύρων· διὸ καὶ τοὺς χρωμένους
 αὐτοῖς τύπτουσιν. ἀπόλλυνται δὲ διὰ τε ἄλλα
 30 συμπτώματα καὶ ὅταν οἱ ἡγεμόνες πολλοὶ γενό-
 μενοι ἕκαστος αὐτῶν μέρος ἀπαγάγῃ. ἀπόλλυσι
 δὲ καὶ ὁ φρῦνος τὰς μελίττας· ἐπὶ τὰς εἰσόδους
 γὰρ ἐλθὼν φυσᾷ τε καὶ ἐπιτηρῶν ἐκπετομένας
 κατεσθίει· ὑπὸ μὲν οὖν τῶν μελιττῶν οὐθὲν
 626b δύναται κακὸν³ πάσχειν, ὁ δ' ἐπιμελόμενος τῶν
 σμηνῶν κτείνει αὐτόν.

τὸ δὲ γένος τὸ τῶν μελιττῶν ὃ εἴρηται ὅτι
 πονηρόν τε καὶ τραχέα τὰ κηρία ἐργάζεται, εἰσὶ
 τινες τῶν μελιττουργῶν οἳ φασὶ μάλιστα τὰς
 νέας τοῦτο ποιεῖν δι' ἀνεπιστημοσύνην· νέαι δ'
 5 εἰσὶν αἱ ἐπέτειοι. οὐχ ὁμοίως δ' οὐδὲ⁴ κεντοῦσιν
 αἱ νέαι· διὸ οἱ ἔσμοι φέρονται· εἰσὶ γὰρ νέων

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losing the sting the bee dies. By stinging they kill large animals, for example a horse before now was killed by bees. But the leaders are the least ill-tempered and sting least.

Bees that die are carried out. And in all other respects the animal is very clean; hence they often even fly off to discharge their excrement because it is ill-smelling. They are annoyed, as we have said,^a by unpleasant smells and by perfumes; hence they sting even those who use them. They die because of various circumstances, especially when a number of leaders is produced and each leads away a section of them. Also the toad destroys the bees; for it comes to the entrances and blows and watches out for them and devours them as they fly out; now it can suffer no harm from the bees, but the person in charge of the hives kills it.

In regard to the kind of bees which we have said^b is bad and makes the combs roughly, there are some bee-keepers who say that it is chiefly the young ones that do this out of ignorance; the current year's bees are young. Nor do the young ones sting in the same way; hence the swarms can be carried, for they con-

^a Not explicitly; cf. 623b20, 626a26.

^b 625a1.

¹ ἀποβαλοῦσα C^a Bk.: ἀποβαλοῦσι A^a G^apr. F^a: ἀποβαλοῦσαι G^arec. Q: ἀποβαλλοῦσι X^c

² α β Guil.: καὶ E^a M^c L^c n Ald. Bk.: om. P K^c Gaza

³ δύναται κακὸν cett.: δεινὸν δύναται E^a L^c n: δύναται Ald.: κακὸν δύναται Bk. ⁴ om. β

μελιττῶν. ὅταν δ' ὑπολίπη τὸ μέλι τοὺς κηφή-
 νας ἐκβάλλουσι, καὶ παραβάλλουσι σῦκα καὶ τὰ
 γλυκέα αὐταῖς. τῶν δὲ μελιττῶν αἱ μὲν πρεσβύ-
 τραι¹ εἴσω ἐργάζονται, καὶ δασεῖαί εἰσι διὰ τὸ
 10 εἴσω μένειν, αἱ δὲ νέαι ἔξωθεν φέρουσι καὶ εἰσὶ
 λειότεραι. καὶ τοὺς κηφήνας δὲ ἀποκτείνουσιν
 ὅταν μηκέτι χωρῇ αὐταῖς ἐργαζομέναις· εἰσὶ γὰρ
 ἐν μυχῷ τοῦ σμήνους. ἤδη δὲ νοσήσαντός τινος
 σμήνους ἦλθόν τινες ἐπ' ἀλλότριον, καὶ μαχό-
 μεναι νικῶσαι ἐξέφερον τὸ μέλι· ἐπεὶ δ' ἀπ-
 ἐκτεινεν ὁ μελιττουργός, οὕτως ἐπεξήεσαν αἱ
 15 ἕτεραι καὶ ἡμύνοντο, καὶ τὸν ἄνθρωπον οὐκ
 ἔτυπτον.

τὰ δὲ νοσήματα ἐμπίπτει μάλιστα εἰς τὰ
 εὐθηνοῦντα τῶν σμηνῶν, ὃ τε καλούμενος κλη-
 ρος.² τοῦτο δὲ³ γίνεται ἐν τῷ ἐδάφει σκωλήκια
 μικρά, ἀφ' ὧν αὐξανομένων ὥσπερ ἀράχνια κατί-
 σχει ὅλον τὸ σμήνος, καὶ σήπεται τὰ κηρία·
 20 ἄλλο δὲ νόσημα οἷον ἀργία τις γίνεται τῶν
 μελιττῶν καὶ δυσωδία τῶν σμηνῶν. νομῇ δὲ
 τῶν μελιττῶν τὸ θύμον· ἄμεινον δὲ τὸ λευκὸν
 τοῦ ἐρυθροῦ. τόπος δ' ἐν⁴ τῷ πνίγει μὴ ἀλεει-
 νός, ἐν δὲ τῷ χειμῶνι ἀλεεινός. νοσοῦσι δὲ

¹ πρεσβ. τὰ α γ Ald. Bk.

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sist of young bees. When the honey has run short they expel the drones, and the bees are supplied with figs and sweet things. The older bees work inside and are hairy because they stay in, while the young ones fetch from outside and are smoother. They also kill the drones when there is no longer room for themselves to work; for they are in the innermost part of the hive. Before now, when a hive had been unhealthy, some of the bees attacked a hive belonging to others, and as they were winning the battle they began carrying out the honey; but when the bee-keeper started to kill them, the others then came out to attack them and began repelling them, and refrained from stinging the man.

The diseases mostly attack hives that are thriving, including the so-called *kleros*^a: this is a formation of little grubs on the floor, and from them as they grow a sort of cobwebs invades the whole hive, and the combs decay. Another disease develops as a sort of laziness in the bees and a bad smell in the hives.^b Thyme is a source of food for bees, and the white is better than the red. Their place should be not warm in the heat of summer, but warm in the winter. They sicken especially when the plant they

^a Cf. VII(VIII) 605b11.

^b Apparently 'foul-brood'; not included among the diseases in VII(VIII) 27.

² κληρός G^a Q Guil. Gaza: σκληρός α γ: σκληρός β Ald.

³ om. α γ Ald. Bk. ⁴ εν τε β

25 μάλιστα ὅταν ἐρυσσιβώδη ἐργάζωνται ὕλην. ὅταν δ' ἄνεμος ἢ μέγας, φέρουσι λίθον ἐφ' ἑαυτοῖς¹ ἔρμα πρὸς τὸ πνεῦμα. πίνουσι δ', ἂν μὲν ἢ ποταμὸς πλησίον, οὐδαμόθεν ἄλλοθεν ἢ ἐντεῦθεν, θέμεναι τὸ ἄχθος πρῶτον· ἐὰν δὲ μὴ ἢ, ἐτέρωθεν πίνουσαι ἀνεμοῦσι τὸ μέλι, καὶ εὐθύς ἐπ' ἔργον πορεύονται.

30 τῇ δὲ τοῦ μέλιτος ἐργασία διττοὶ καιροὶ εἰσιν, ἕαρ καὶ μετόπωρον· ἥδιον δὲ καὶ λευκότερον καὶ τὸ σύνολον κάλλιον ἔστι τὸ ἔαρινόν τοῦ μετοπωρινου. μέλι δὲ κάλλιστον² γίνεται ἐκ νέου κηροῦ καὶ ἐκ μόσχου· τὸ δὲ πυρρὸν αἷσχιον διὰ τὸ κηρίον· διαφθείρεται γὰρ ὥσπερ οἶνος ὑπ' ἀγγείου· διὸ δεῖ ξηραίνειν αὐτό. ὅταν δὲ τὸ
627a θύμον ἀνθῇ καὶ πληρὲς γίνηται³ τὸ κηρίον, οὐ πήγνυται τοῦτο. ἔστι δὲ καλὸν τὸ χρυσοειδές· τὸ δὲ λευκὸν οὐκ ἐκ θύμου εἰλικρινοῦς, ἀγαθὸν δὲ πρὸς ὀφθαλμοὺς καὶ ἔλκη. τοῦ δὲ μέλιτος τὸ μὲν
5 ἀσθενὲς αἰεὶ ἄνω ἐπιπολάζει, ὃ δεῖ ἀφαιρεῖν, τὸ δὲ καθαρὸν κάτω. ὅταν δ' ἡ ὕλη ἀνθῇ κηρὸν ἐργάζονται· διὸ ἐκ τοῦ σίμβλου τότ' ἐξαιρετέον τὸν κηρὸν· ἐργάζονται γὰρ εὐθύς. ἀφ' ὧν δὲ φέρουσιν ἔστι τάδε, ἀτρακτυλλίς μελίλωτον

¹ ἑαυταῖς L^c n Ald. edd.

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are working on is mildewed. When there is a strong breeze they carry a stone upon themselves as ballast against the wind. If there is a river near, they drink from nowhere else but there, having first stored their load; but if there is not, in drinking elsewhere they vomit up^a the honey and proceed at once to work.

They have a double season for making their honey, spring and autumn; the spring honey is sweeter and paler and in general better than the autumn honey. And the best honey comes from new wax and young plant-growth. The red honey is worse because of its honeycomb: it is spoiled like wine by its container, which is why that has to be dried. When the thyme is in flower and the comb becomes full, this honey does not set. It is the golden honey that is good; the pale does not come from unmixed thyme, but it is good for eyes and sores. The weak part of the honey always floats on the surface; it should be removed, and the pure honey is below. When the woodland is in flower they work at wax; hence one should then take the wax out of the hive box, for they go to work immediately. The plants from which they fetch are these: atraktyllis,

^a The Latin versions interpret this as vomiting the honey into the honeycombs.

² β Guil. Sn. Dt.: κάλλιον α γ Ald. Trap. Gaza Bk.

³ γίγεται C^a β P K^c: fuerit Guil.

- ἀσφόδελος μυρρίνη φλεὼς ἄγνος σπάρτον. ὅταν
 10 δὲ τὸ θύμον ἐργάζωνται, ὕδωρ μιγνύουσι πρὶν
 τὸ κηρίον καταλείφειν.

- ἀφοδεύουσι δ' αἱ¹ μέλιτται πᾶσαι ἢ ἀποπετό-
 μεναι, ὥσπερ εἴρηται, ἢ εἰς ἓν κηρίον. εἰσὶ δ' αἱ
 μικραὶ ἐργάτιδες μᾶλλον τῶν μεγάλων, ὥσπερ
 εἴρηται, ἔχουσι δὲ τὰ πτερὰ περιτετριμμένα καὶ
 χροῖαν μέλαιναν καὶ ἐπικεκαυμένα· αἱ δὲ φαναὶ
 15 καὶ λαμπραὶ ὥσπερ γυναιῖκες ἀργαί. δοκοῦσι δὲ
 χαίρειν αἱ μέλιτται καὶ τῷ κρότῳ, διὸ καὶ κρο-
 τοῦντές φασιν ἀθροίζειν αὐτὰς εἰς τὸ σμήνος
 ὀστράκοις τε καὶ ψήφοις.² ἔστι μέντοι ἄδηλον
 ὅλως εἰ ἀκούουσιν, καὶ πότερον δι' ἡδονὴν τοῦτο
 ποιοῦσιν ἢ διὰ φόβον. ἐξελαύνουσι δὲ καὶ τὰς
 20 ἀργὰς αἱ μέλιτται καὶ τὰς μὴ φειδομένας. διή-
 ρηνται δὲ τὰ ἔργα, ὥσπερ εἴρηται πρότερον, καὶ
 αἱ μὲν κηρία ἐργάζονται, αἱ δὲ τὸ μέλι, αἱ δ' ἐρι-
 θάκην· καὶ αἱ μὲν πλάττουσι κηρία, αἱ δὲ ὕδωρ
 φέρουσιν εἰς τοὺς κυττάρους καὶ μιγνύουσι τῷ

¹ om. β (exc. S^c) γ Ald.

² C^a A^apr. Gpr. E^a K^c M^c L^cpr. n Bk. Dt.: ψόφοις A^arec.
 G^acorr. F^a X^c β P L^ccorr. Ald. Sn.: ψ' lac. φοις Q: om. Scot.:
conpercussione aeramentorum Alb.: *ensibus* Guil.: *sono*
 Trap.: *tinnitu aeris* Gaza: cf. Pliny XI 22.68 *gaudent plausu*
atque tinnitu aeris

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honey-lotus, asphodel, myrtle, flowering reed, agnos, broom. When they are working at the thyme they mix in water before smearing over the comb.

All the bees discharge their excrement either while flying away, as we have said,^a or into one comb. The small bees tend to be workers more than the large ones, as we have said^b; their wings get worn away at the edges, their colour is dark, and they are sunburnt. The bright and showy ones, as with women, are lazy. Bees seem to like the sound of a rattle, and so people say they collect them into the hive by rattling pots and counters. It is not clear, however, if they hear it^c at all, and whether they act thus through pleasure or through fear. The bees drive out both the lazy ones and those that do not save. The tasks have been divided, as we have said before,^d and some are working at combs, some at the honey, some at erithake^e; and some are shaping combs, others are carrying water to the cells and

^a 626a25. ^b624b24.

^c In the context the question seems to be, not generally whether bees are deaf, but whether they hear this sound at a distance; however in view of *Metaph.* A 980b23, which denies that bees hear sounds, it is possible that Arist. is raising the general question. In either case this passage conflicts with *Metaph.* A 980b23; nor does the addition of *τε* in some MSS ("if they hear anything") alter the interpretation. The further clause "and whether . . ." is elliptical for "and, if they do hear it, whether . . .". It was not generally believed that bees are deaf (cf. Virg. G. IV 50, 64; Keller II. 425), so that it is *Metaph.* A 980b23 that is anomalous. 627a24-28 below seems to imply that bees hear buzzing signals. ^d625b18. ^eCf. 623b23, 626a7 notes.

μέλιτι, αἱ δ' ἐπ' ἔργον ἔρχονται. ὀρθρῖαι δὲ σιω-
 25 πῶσιν ἕως ἂν μία ἐγείρῃ βομβήσασα δις ἢ τρίς·
 τότε δ' ἐπ' ἔργον ἀθρόαι πέτονται, καὶ ἐλθοῦσαι
 πάλιν θορυβοῦσι τὸ πρῶτον, κατὰ μικρὸν δ'
 ἥττον ἕως ἂν μία περιπετομένη βομβήσῃ, ὥσπερ
 σημαίνουσα καθεύδειν· εἴτ' ἐξαπίνης σιωπῶσιν.
 διαγινώσκεται δ' ἰσχύειν τὸ σμῆνος τῷ¹ ψόφον
 30 εἶναι πολὺν καὶ κινεῖσθαι ἐξιούσας καὶ εἰσιούσας·
 τότε γὰρ σχαδόνας ἐργάζονται. πεινώσι² δὲ
 μάλισθ' ἥνικ' ἂν ἄρχωνται ἐκ τοῦ χειμῶνος.
 ἀργότεραι δὲ γίνονται ἐὰν πλεῖόν τις καταλίπη
 μέλι βλήττων·³ ἀλλὰ δεῖ πρὸς τὸ πλῆθος κατα-
 627b λείπειν τὰ κηρία· ἀθυμότερον δ' ἐργάζονται κἂν
 ἐλάττω καταλειφθῇ. ἀργότεραι δὲ γίνονται κἂν
 μέγα τὸ κυψέλιον⁴ ᾗ· ἀθυμότερον γὰρ πονοῦσιν.
 βλήττεται δὲ σμῆνος χοᾶ⁵ ἢ τρία ἡμίχοα, τὰ δ'
 εὐθηνοῦντα δύο χοᾶς ἢ πέντε ἡμίχοα· τρεῖς δὲ
 χοᾶς ὀλίγα.

5 πολέμιον δὲ πρόβατον⁶ ταῖς μελίτταις καὶ οἱ

¹ τῷ τὸν a Bk. Dt.

² a Scot. Alb. Guil. Trap. Gaza Bk.: πίνουσι β E^a M^c L^c Ald.: πίνωσι P K^c

³ β P K^c M^c L^c rec. Ald.: βλήττον a: βλάπτων E^a: βλάπτων L^c pr. n: βλίττων Cs. edd.

⁴ κυψέλλιον C^a β L^c rec. Ald.

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mixing it with the honey, others are on their way to work. At daybreak they are silent until one bee arouses them by buzzing two or three times. Then they all fly out together to work, and on returning they are noisy at first but gradually become less so until a single bee flies round buzzing as though signalling for sleep; then suddenly they are silent. The hive is diagnosed to be strong by the amount of noise and by the movement of bees going out and coming in; for then they are working at grubs. They are most hungry when they begin after the winter. But they become lazier if one leaves behind too much honey when harvesting the combs; on the contrary one should leave the combs in proportion to the population; they work with less spirit also if too few are left. They become lazier also if the hive-box is large; for they labour with less spirit. The harvest from a hive is a pitcher^a or three half-pitchers, and the thriving ones yield two pitchers or five half-pitchers, and a few three pitchers.

The flocks^b are hostile to bees, and so are wasps,

^a See Appendix for weights and measures.

^b *πρόβατα* in Arist.'s time signified goats and sheep; earlier the mixed flocks also included cattle (cf. LSJ s.v.; VIII(IX) 611a2, X 638a9 note).

⁵ *χοὰ β* L^crec. Guil. Ald.: *χοαῖς α*: *χοὰς* E M^c n: *χοαὶ* P K^c: *χόην* L^cpr.

⁶ *πρόβατα β* P K^c M^c L^crec.: *πρόβατι* A^apr.: *προβατιταῖς* μελ. G^a Q

- σφήκες, ὥσπερ εἴρηται καὶ πρότερον. θηρεύουσι δὲ τούτους καὶ οἱ μελιττουργοί, λεπάδα τιθέντες καὶ κρέας εἰς αὐτὴν ἐμβάλλοντες· ὅταν δὲ πολλοὶ ἐμπίπτωσιν, ἐπὶ¹ τὸ πῦρ πωμάσαντες ἐπιτιθέασιν. κηφήνες δ' ὀλίγοι ἐνόντες ὠφελοῦσι τὸ
- 10 σμήνος· ἐργατικωτέρας γὰρ ποιοῦσι τὰς μελίττας. προγινώσκουσι δὲ καὶ χειμῶνα καὶ ὕδωρ αἱ μέλιτται· σημεῖον δέ, οὐκ ἀποπέτονται γὰρ ἀλλ' ἐν τῇ εὐδία αὐτοῦ ἀνειλοῦνται, ὥ² γινώσκουσιν οἱ μελιττουργοὶ ὅτι χειμῶνα προσδέχονται. ὅταν δὲ κρεμάσωνται ἐξ ἀλλήλων ἐν τῷ σμήνει, σημεῖον
- 15 γίνεται τοῦτο ὅτι ἀπολείψει τὸ σμήνος. ἀλλὰ καταφυσῶσι τὸ σμήνος οἷνῳ γλυκεῖ οἱ μελιττουργοὶ ὅταν τοῦτ' αἰσθωνται. φυτεύειν δὲ συμφέρεи περὶ³ τὰ σμήνη ἀχράδας, κυάμους, πόαν Μηδικήν, Συριάν, ὤχρους, μυρρίνην,⁴ μήκωνα, ἔρφυλλον, ἀμυγδαλὴν.⁵ γινώσκουσι δέ τινες τῶν μελιττουργῶν τὰς ἑαυτῶν ἐν τῷ νομῷ ἄλευρα
- 20 καταπάσαντες. εἰ δ' ἔαρ ὄψιον γένηται ἢ αὐχμός, καὶ ὅταν ἐρυσίβη, ἐλάττονα⁶ ἐργάζονται αἱ μέλιτται τὸν γόνον.

¹ εἰς β L^c rec. Ald.

² α Bk.: δ β γ Ald.: καὶ m

³ παρὰ β γ (exc. L^c) Guil.

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as we have said before.^a The bee-keepers in fact hunt the latter, setting out a plate and putting meat on it; when a number settle, they cover them and put them on the fire. The presence of a few drones benefits the hive, for they make the bees more industrious. The bees foretell both wintry weather and rain; a sign is that they do not fly off but crowd around the hive in fine weather, by which the bee-keepers learn that they are expecting a storm. When they hang from each other in the hive, that becomes a sign that the colony is going to leave. However, the bee-keepers sprinkle the hive with sweet wine when they have perceived this. It is beneficial to plant around the hives wild pears, beans, Medic grass, Syrian grass, ochrus, myrtle, poppy, herpyllus, almond. Some bee-keepers know their own bees out foraging, through having dusted them with flour. If spring comes late or if there is a drought, and when there is mildew, the bees work at fewer grubs.^b

^a 626a8.

^b Cf. V 553b20.

⁴ *συρίαν . . . μυρρίνην*] *πόαν συρίαν ὦ. μ. β: συρίαν ὠχρας μυρ.*
E^a K^c M^c L^cpr. n: συριανόχρους μ. P: συρ. ὠχρου συμρίνην A^a
G^apr. F^apr. : σ. ὠχρου μυρίνην G^arec. Q F^arec. X^c

⁵ *ἀμυγδάλην β P K^c: μυγάλην α*

⁶ *ἐλάττον C^a A^acorr. Q F^a X^c γ Ald. Bk.: ἐλάττον A^apr. G^a:*
minorem Guil.: minus Gaza

τὰ μὲν οὖν περὶ τὰς μελίττας τοῦτον ἔχει τὸν τρόπον.

- XLI τῶν δὲ σφηκῶν ἐστὶ δύο γένη. τούτων δ'¹ οἱ μὲν ἄγριοι σπάνιοι, γίνονται δ' ἐν τοῖς ὄρεσι, καὶ
 25 τίκτουσιν οὐ κατὰ γῆς ἀλλ' ἐν ταῖς δρυσί, τὴν μὲν μορφὴν μεῖζους καὶ προμηκέστεροι καὶ μελαγχρώτες τῶν ἐτέρων μᾶλλον, ποικίλοι δὲ καὶ ἔγκεντροι πάντες καὶ ἀλκιμώτεροι, καὶ τὸ πλήγμα ὀδυνηρότερον αὐτῶν ἢ ἐκείνων· καὶ γὰρ² τὸ κέντρον ἀνάλογον μεῖζον τὸ τούτων. οὗτοι μὲν οὖν διετίζουσι καὶ ὀρώνται καὶ³ τοῦ
 30 χειμῶνος ἐκ δρυῶν κοπτομένων ἐκπετόμενοι, ζῶσι δὲ φωλοῦντες τὸν χειμῶνα· ἡ δὲ διατριβὴ ἐν τοῖς ξύλοις. εἰσὶ δ' αὐτῶν οἱ μὲν μήτραι οἱ δ' ἐργάται, ὥσπερ καὶ τῶν ἡμερωτέρων· τίς δ' ἡ φύσις τοῦ ἐργάτου καὶ τῆς μήτρας ἐπὶ τῶν
 628a ἡμερωτέρων ἔσται δῆλον. ἔστι γὰρ καὶ τῶν ἡμέρων σφηκῶν γένη δύο,⁴ οἱ μὲν ἡγεμόνες οὓς καλοῦσι μήτρας, οἱ δ' ἐργάται. εἰσὶ δὲ μεῖζους οἱ ἡγεμόνες πολὺ καὶ πραότεροι. καὶ οἱ μὲν ἐργάται οὐ διετίζουσιν, ἀλλὰ πάντες ἀποθνήσκουσιν
 5 ὅταν χειμῶν ἐπιπέσῃ (φανερὸν δ' ἐστὶ τοῦτο· τοῦ γὰρ χειμῶνος ἀρχομένου μὲν μωροὶ γίνονται οἱ ἐργάται αὐτῶν, περὶ τροπᾶς δ' οὐ φαίνονται

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This then is the position regarding the bees.

Among the wasps there are two kinds. Of these XLI
the wild ones are scarce; they are produced in the mountains and give birth not underground but in the oaks; in form they are larger, more elongated, with more black in their colour than the others, but variegated; they all have stings and are fiercer and sting more painfully than the others, for their sting is larger than theirs, being proportionate to their own size. Now these live through to the next year and are seen even in winter flying out of oaks as they are felled; but they live in hiding during the winter; they spend their time in the tree trunks. Some of them are mother-wasps^a and others are workers, as in the tamer ones; the nature of the worker and of the mother-wasp will be evident in the case of the tamer wasps. For the tame ones also have two kinds, the leaders who are called mother-wasps and the workers. The leaders are much larger and milder. And the workers do not live through the year but all die when winter has come on (this is apparent, for at the beginning of the winter their workers become stupid, and at about

^a *μητραι*, which usually means "wombs" but is also used by metaphor and synecdoche.

¹ om. *β*

² om. *β* Guil.

³ om. *β* Ald.

⁴ *δύο γένη* transp. C^a *γ* Ald. edd.

ὅλως), οἱ δ' ἡγεμόνες οἱ καλούμενοι μήτραι
 ὀρώνται δι' ὅλου τοῦ χειμῶνος καὶ κατὰ γῆς
 φωλεύουσιν· ἀροῦντες γὰρ καὶ σκάπτοντες ἐν τῷ
 10 χειμῶνι μήτρας μὲν πολλοὶ ἐωράκασιν, ἐργάτας
 δ' οὐθεῖς.

ἡ δὲ γένεσις τῶν σφηκῶν ἐστὶ τοιάδε. οἱ ἡγε-
 μόνες, ὅταν λάβωσι τόπον εὐσκοπον ἐπιόντος τοῦ
 θέρους, πλάττονται τὰ κηρία καὶ συνίστανται οὓς
 καλοῦσι σφηκωνεῖς τοὺς μικροὺς, οἷον τετραθύ-
 ρους ἢ ἐγγὺς τούτων, ἐν οἷς σφήκες γίνονται καὶ
 15 οὐ μήτραι. τούτων δ' αὐξηθέντων πάλιν μετὰ
 τούτους ἄλλους μείζους¹ συνίστανται, καὶ πάλιν
 τούτων αὐξηθέντων ἑτέρους, ὥστε τοῦ μετοπώ-
 ρου τελευτῶντος πλείστα καὶ μέγιστα γίνεσθαι
 σφηκία, ἐν οἷς ὁ ἡγεμὼν ἢ καλουμένη μήτρα
 οὐκέτι σφήκας γεννᾷ ἀλλὰ μήτρας. γίνονται δ'
 οὔτοι ἄνω ἐπὶ τοῦ σφηκίου ἐπιπολῆς μείζους
 20 σκώληκες ἐν θυρίσι συνεχέσι τέτταρσιν ἢ μικρῷ
 πλείοσιν, παραπλησίως δ' ὥσπερ ἐν τοῖς κηρίοις

¹ μείζ. ἰστοὺς β *L*^{rec.} *Ald.*

^a For τοὺς *Dt.* conjectures ἰστοὺς here, "wasperies which are small webs" (cf. 624a7 of the bees), which is in fact read

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the solstice are not seen at all), whereas the leaders which are called mother-wasps are seen throughout the winter and hide underground; for while ploughing and digging in the winter many have seen mother-wasps but none has seen workers.

The generation of the wasps is as follows. The leaders at the onset of summer, having chosen a place with a good look-out, start fashioning the combs and construct what are called wasperies of the small sort,^a that is, with four openings approximately, in which wasps are produced and not mother-wasps. When these have grown, the leaders again construct other bigger ones and, when they have grown, others; so that as autumn ends there are very many of the largest wasp-combs in which the leader, the so-called mother-wasp, generates no longer wasps but mother-wasps. These are produced above on the surface of the wasp-comb as larger grubs in contiguous sets of four or slightly more cells, and those of the leaders^b are produced in

two lines below by the β MSS though Dt. does not accept it there. But τοὺς correctly contrasts these small units with the larger ones to be mentioned at 628a15 and 17. Moreover the comparison with a web does not hold for wasps as it does for bees.

^b Sn., A.-W., Th., Louis interpret these as king-bees, but this is awkward when ἐν τοῖς κηπλοῖς is used again in the next sentence of wasps. Satisfactory sense is given by Gaza and Scaliger: the arrangement of the wasp leaders' cells is like that of the original four-celled units described at 628a13.

τὰ τῶν ἡγεμόνων. ἐπειδὴν δὲ γένωνται οἱ ἐργά-
ται σφῆκες ἐν τοῖς κηρίοις, οὐκέτι οἱ ἡγεμόνες
ἐργάζονται, ἀλλ' οἱ ἐργάται αὐτοῖς τὴν τροφήν
εἰσφέρουσιν· φανερόν δ' ἐστὶ τοῦτο τῷ μηκέτι

- 25 τοὺς ἡγεμόνας ἐκπέτεσθαι τῶν ἐργατῶν, ἀλλ'
ἔνδον μένοντας ἡσυχάζειν. πότερον δ' οἱ περυσι-
νοὶ ἡγεμόνες, ὅταν νέους ποιήσωσιν ἡγεμόνας,
ἀποθνήσκουσιν μετὰ¹ τῶν νέων σφηκῶν καὶ
τοῦθ' ὁμοίως συμβαίνει, ἢ καὶ πλείω χρόνον
δύνανται ζῆν, οὐδὲν ὥπται πω· οὐδὲ² γῆρας
οὔτε μήτρας οὔτε τῶν ἀγρίων σφηκῶν οὐδεὶς πω
30 ὥπται ἑωρακώς, οὐδ' ἄλλο τοιοῦτον οὐδὲν πάθος.
ἔστι δ' ἡ μήτρα πλατὺ καὶ βαρὺ, καὶ παχύτερον
καὶ μείζον τοῦ σφηκός, καὶ πρὸς τὴν πτῆσιν διὰ
τὸ βάρος οὐκ ἄγαν ἰσχυρόν· οὐδὲ δύνανται ἐπὶ τὸ
πολὺ πέτεσθαι· διὸ καὶ κάθηνται ἐν τοῖς σφη-
κίοις αἰεὶ, συμπλάττουσαι καὶ διοικοῦσαι τὰ ἔνδον.

- 35 ἐν δὲ τοῖς πλείστοις σφηκίοις ἔνεισιν αἱ
628b μήτραι καλούμεναι. ἀμφισβητεῖται δὲ πότερον
ἑγκεντροὶ εἰσιν ἢ ἄκεντροι· εἰκότασι δ' ὥσπερ οἱ
τῶν μελιττῶν ἡγεμόνες ἔχειν μέν, οὐκ ἐξίεναι δὲ
οὐδὲ βάλλειν. τῶν δὲ σφηκῶν οἱ μὲν ἄκεντροὶ
εἰσιν ὥσπερ κηφῆνες, οἱ δ' ἔχουσι κέντρον. εἰσὶ
5 δ' οἱ ἄκεντροι ἐλάττους καὶ ἀμενηνότεροι καὶ οὐκ

a similar way to those within the combs. After the working wasps have been produced in the combs, the leaders work no longer, but the workers bring them in their food. This is shown by the fact that the leaders of the workers no longer fly out but remain quiet inside. As to whether the previous year's leaders, after making new leaders, die together with the new wasps and their death occurs in the same way, or whether they can live still longer, no observation has yet been made; nor has anyone yet been seen who has himself observed old age in either a mother-wasp or the wild wasps, or any other development of this sort in them. The mother-wasp is broad and heavy, both thicker and larger than the wasp, and because of its weight not very strong for flying; nor can they fly for the most part: this is indeed why they sit always in the wasp-combs, fashioning and arranging things within.

The so-called mother-wasps are present in the majority of wasp-combs. There is doubt whether they have stings or not; it seems likely that, like the bees' leaders, they have stings but do not put them out nor strike. Of the wasps, some are stingless like drones while the others have a sting. The stingless are smaller and feebler and do not defend them-

¹ β L^{rec.} Ald.: ἀπὸ α γ: *a novis* Guil. Trap. Gaza: ὑπὸ coni. edd.

² οὐρε β Ald.

ἀμύνονται, οἳ δ' ἔχοντες τὰ κέντρα μείζους καὶ ἄλκιμοι· καὶ καλοῦσι τούτους ἔνιοι μὲν ἄρρενας, τοὺς δ' ἀκέντρους θηλείας. πρὸς δὲ τὸν χειμῶνα ἀποβάλλειν δοκοῦσι πολλοὶ τῶν ἔχόντων τὰ κέντρα· αὐτόπτη¹ δ' οὐπω ἐντετυχήκαμεν.

- γίνονται δ' οἳ σφῆκες μᾶλλον ἐν τοῖς αὐχοῖς
 10 καὶ ἐν ταῖς χώραις ταῖς τραχεαῖς, γίνονται δ' ὑπὸ γῆν, καὶ τὰ κηρία πλάττουσιν ἐκ φορυτοῦ² καὶ γῆς, ἀπὸ μιᾶς ἀρχῆς ἕκαστον ὥσπερ ἀπὸ ρίζης. τροφῇ δὲ χρῶνται μὲν καὶ ἀπ' ἀνθῶν τινῶν καὶ καρπῶν, τὴν δὲ πλείστην ἀπὸ ζωοφάγίας. ὠμμένοι δ' εἰσὶν ὀχευόμενοι ἤδη καὶ τῶν
 15 ἄλλων τινές· εἰ δ' ἄκεντροι ἄμφω ἢ κέντρα ἔχοντες, ἢ ὁ μὲν ὁ δ' οὐ, οὐπω ὥπται. καὶ τῶν ἀγρίων ὀχευόμενοι ὠμμένοι, καὶ³ ὁ ἕτερος ἔχων κέντρον· περὶ θατέρου δ' οὐκ ὥφθη. ὁ δὲ γόνος οὐ δοκεῖ ἐκ τοῦ τόκου⁴ γίνεσθαι, ἀλλ' εὐθὺς μείζων εἶναι ἢ ὡς σφῆκὸς τόκος. ἐὰν δὲ λάβῃ τις
 20 τῶν ποδῶν σφῆκα καὶ τοῖς πτεροῖς ἐὰ βομβεῖν, προσπέτονται οἳ ἄκεντροι, οἳ δὲ τὰ κέντρα ἔχοντες οὐ προσπέτονται· ὧ τινὲς τεκμηρίῳ χρῶνται ὡς τῶν μὲν ἀρρένων ὄντων τῶν δὲ θηλειῶν. ἀλίσκονται δ' ἐν τοῖς σπηλαίοις τοῦ χειμῶνος καὶ

¹ αὐτόπται β L^crec. Ald.: αὐτόπη P K^c

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selves, but those with the stings are bigger and fierce; and some call the latter males and the stingless ones females. Towards the winter many of those with stings are believed to lose them; but we have not yet come across an eyewitness.

The wasps are produced more in droughts and in rough country places; they are produced underground and fashion the combs out of rubbish and earth, each from a single starting-point as from a root. Their food is taken both from certain flowers and from fruits, but for the most part from animal flesh. Some of the others have before now been seen mating; but whether both were stingless or had stings, or one but not the other, has not yet been seen. And some wild ones have been seen mating, and one had a sting but there was no observation of the other. The embryos do not seem to be produced by birth but to be straightaway too large to be born from a wasp.^a If one takes a wasp by its feet and allows it to buzz with its wings, the stingless ones fly towards it while those with stings do not fly towards it; some use this as evidence that one sort are males and the others females. Those caught in the caves during the winter include some with

^a Arist. expresses no such doubt elsewhere: 'birth' is assumed at 628a18, 629a35, *GA* I 721a5, III 761a6. Possibly he wishes here merely to emphasise the size—they *seem* too big; but cf. 629a23 on anthrenas.

² φωρυτοῦ β P K^c

³ om. β

⁴ γόνου β L^crec. : gono Guil.

- ἔχοντες ἔνιοι κέντρα καὶ οὐκ ἔχοντες. ἐργάζονται δ' οἱ μὲν μικρὰ καὶ ὀλίγα σφηκία <οἱ δὲ
 25 πολλὰ καὶ μεγάλα>.¹ αἱ δὲ μήτραι καλούμεναι ἀλίσκονται τραπείσης² τῆς ὥρας, αἱ πολλαὶ περὶ τὰς πτελέας· συλλέγουσι γὰρ τὰ γλίσχρα καὶ³ κομμιώδη.⁴ γεγένηται δέ που μητρῶν πλήθος γενομένων τῷ ἔμπροσθεν ἔτει πολλῶν σφηκῶν καὶ ἐπομβρίας. θηρεύονται δὲ περὶ τοὺς κρημνοὺς
 30 καὶ τὰ ῥήγματα τῆς γῆς τὰ εἰς ὀρθόν, καὶ πάντες φαίνονται ἔχοντες κέντρα.

τὰ μὲν οὖν περὶ τοὺς σφήκας τοῦτον ἔχει τὸν τρόπον.

- XLII. αἱ δ' ἀνθρῆναι ζῶσι μὲν οὐκ ἀνθολογούμεναι ὥσπερ αἱ μέλιτται ἀλλὰ τὰ πολλὰ σαρκοφάγουσαι (διὸ καὶ περὶ τὴν κόπρον διατρίβουσιν·
 35 θηρεύουσι γὰρ τὰς μεγάλας μυίας, καὶ ὅταν καταλάβωσιν ἀφελοῦσαι τὴν κεφαλὴν ἀποπέτονται φέρουσαι τὸ σῶμα τὸ λοιπόν), ἄπτονται δὲ καὶ τῆς γλυκείας ὀπώρας. τροφῇ μὲν οὖν χρῶνται τῇ εἰρημένῃ. ἔχουσι δ' ἡγεμόνας ὥσπερ αἱ μέλιτται καὶ οἱ σφήκες· καὶ οἱ ἡγεμόνες οὗτοι
 629a 5 μείζονές εἰσι τῷ μεγέθει κατὰ λόγον πρὸς τὰς ἀνθρῆνας⁵ ἢ ὁ τῶν σφηκῶν πρὸς τοὺς⁶ σφήκας καὶ ὁ τῶν μελιττῶν πρὸς τὰς μελίττας. διατρί-

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stings and some without. Some build combs that are small and few <while others build many large ones>. The so-called mother-wasps are caught after the turn of the season, most of them around the elms; for they collect the sticky and gummy stuff. Mother-wasps have occurred in large numbers in some places after there have been many wasps and much rain in the previous year. They are hunted around the cliffs and the vertical crevices in the ground, and all are seen to have stings.

This then is the position regarding the wasps.

The anthrenas live not by gathering from flowers like the bees but mostly by eating flesh (hence they stay around dung: for they hunt the big flies, and after catching them remove the head and fly away carrying the rest of the body), and they also attack sweet fruit. Their food then is the above-mentioned. They have leaders like the bees and wasps. And these leaders are of greater size in proportion to the anthrenas than the leader of the wasps is to the wasps and that of the bees to the bees. This one too

XLII

¹ Scot. Alb. Gaza edd. post Grynaeum 1531: om. codd. Guil. Trap. Ald., fortasse recte

² α Bk. Dt.: *πρωιούσης β* Ald.: *περιούσης* E^a P M^c L^c: *περιούσης* K^c n: *in fine hyemis* Scot. Alb.: *procedente tempore* Guil.: *a solstitio* Gaza ³ *καὶ τὰ β* L^crec.

⁴ α L^cpr. Ald. edd.: *κομώδη β*: *κολλώδη* S^c L^crec.: *μομμιώδη* E^a: *μομβιώδη* P M^c: *βομβιώδη* K^c: *μομιώδη* n: *gommosa* Guil.

⁵ *τὰς β* E^a n Ald.

⁶ *ἀρθρή-*, *ἀνθρί-*, *ἀρθρί-*, *ἀθρί-* codd. var. hic et infra.

- βει δ' ἔσω καὶ οὗτος ὥσπερ¹ ὁ τῶν σφηκῶν ἡγε-
 μών. ποιοῦσι δὲ τὸ σμήνος ὑπὸ γῆν αἱ ἀνθρῆναι,
 ἐκφέρουσαι τὴν γῆν ὥσπερ οἱ μύρμηκες·
 ἀφесμός γάρ ὥσπερ τῶν μελιττῶν οὐ γίνεται
 10 οὔτε τούτων οὔτε τῶν σφηκῶν, ἀλλ' αἰεὶ ἐπιγινό-
 μεναι νεώτεραι αὐτοῦ μένουσι καὶ τὸ σμήνος
 μεῖζον ποιοῦσιν ἐκφέρουσαι τὸν χοῦν. γίνεται δὲ
 μεγάλα τὰ σμήνη· ἥδη γάρ² εὐθηνούντος
 σμήνους κόφινοι τρεῖς καὶ τέτταρες ἐξήρηνται
 κηρίων. οὐδὲ τροφήν³ ὥσπερ αἱ μέλιτται ἀποτί-
 15 θενται, ἀλλὰ φωλεύουσι τὸν χειμῶνα, αἱ δὲ πλεῖ-
 σται ἀποθνήσκουσιν· εἰ δὲ καὶ πᾶσαι, οὐπω
 δῆλον. οἱ δ' ἡγεμόνες πλείους ἑνὸς οὐ γίνονται
 ἐν τοῖς σμήνεσιν ὥσπερ ἐν τοῖς τῶν μελιττῶν οἱ
 διασπῶσι τὰ σμήνη τῶν μελιττῶν. ὅταν δὲ
 πλανηθῶσί τινες τῶν ἀνθρηνῶν ἀπὸ τοῦ σμή-
 νους, συστραφεῖσαι πρὸς τινα ὕλην ποιοῦσι κηρία,
 20 οἷάπερ⁴ καὶ ὁράται ἐπιπολῆς ὄντα πολλάκις, καὶ
 ἐν τούτῳ ἐργάζονται ἡγεμόνα ἓνα· οὗτος δ'
 ἐπ' αὐτὸν ἐξέλθῃ καὶ αὐξήσῃ ἀπάγει λαβὼν καὶ
 κατοικίζει μεθ' αὐτοῦ εἰς σμήνος.

περὶ δ' ὁχείας τῶν ἀνθρηνῶν οὐδὲν ὥπται πω,
 οὐδὲ πόθεν γίνεται ὁ γόνος. ἐν μὲν οὖν ταῖς

¹ ὥσπερ καὶ β (exc. T^c)

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spends its time inside, like the wasps' leader. The anthrenas make their hive underground, carrying out the earth like ants; for no swarming takes place with them or with wasps, as it does with bees, but younger ones are continually added and stay there and make the hive larger by carrying out the spoil. The hives become big: before now, when a hive has been thriving, three and even four baskets of combs have been taken out. Nor do they store away food like the bees, but hide for the winter, and most of them die: whether in fact all die is not yet clear. More than one leader is not produced in their hives, as there is among bees whose leaders disperse the hives. But some individual anthrenas, having strayed from the hive, cluster together against some woodland tree and make combs, such as are indeed often seen when on the outer surface, and in this they make one leader; and he, when he has emerged and grown, takes them away and settles them with himself into a hive.

On the mating of the anthrenas nothing has yet been observed, nor whence comes the embryo.^a Now

^a The mating and generating of anthrenas is reported without expressions of doubt at *GA* III 761a2. Cf. 628b18 (and note) on wasps. The possession of stings may have seemed relevant as evidence of sex (cf. *GA* III 759b2, 30).

² γὰρ ἐξ β

³ τροφήν δ' C^a E^a P M^c L^c Ald. Bk.

⁴ ἀπερ β L^c rec. Guil.

25 μελίτταις ἄκεντροί εἰσι καὶ οἱ κηφήνες καὶ οἱ
 βασιλεῖς, καὶ τῶν σφηκῶν ἔνιοι ἄκεντροί εἰσι,
 καθάπερ εἴρηται πρότερον· αἱ δ' ἀνθρώποι πάντες
 φαίνονται κέντρον ἔχουσαι. ἐπισκεπτέον δὲ μάλ-
 λον καὶ περὶ τοῦ ἡγεμόνος, εἰ κέντρον ἔχει ἢ μή.

XLIII οἱ δὲ βομβύλιοι τίκτουσιν ὑπὸ πέτρας ἐπ'
 30 αὐτῆς τῆς γῆς, θυρίσι δυσὶν ἢ μικρῶ πλείοσιν·
 εὗρίσκεται δὲ καὶ μέλιτος ἀρχὴ φαύλου τινὸς ἐν
 τούτοις.

ἡ δὲ τευθρηδῶν προσεμφερῆς μὲν ἐστὶ τῇ
 ἀνθρώπῳ, ποικίλον δέ, καὶ τὸ πλάτος ὅμοιον τῇ
 μελίττῃ. λίχνον δ' ὃν καὶ πρὸς τὰ μαγειρεῖα καὶ
 τοὺς ἰχθύας καὶ τὴν τοιαύτην ἀπόλαυσιν κατὰ
 35 μόνας προσπέταται. ἐκτίκει δὲ κατὰ γῆς
 629b ὥσπερ οἱ σφήκες, πολύχουν δ' ἐστί, καὶ τὸ
 τευθρήνιον¹ αὐτῶν πολὺ μείζον ἢ τῶν σφηκῶν
 καὶ προμηκέστερον.

τὰ μὲν οὖν περὶ τὴν τῶν μελιττῶν καὶ τῶν
 σφηκῶν καὶ τῶν ἄλλων τῶν τοιούτων ἐργασίαν
 5 καὶ τὸν βίον τοῦτον ἔχει τὸν τρόπον.

XLIV περὶ δὲ τὰ ἥθη τῶν ζώων, ὥσπερ εἴρηται καὶ²
 πρότερον, ἐστὶ θεωρῆσαι διαφορὰς πρὸς ἀνδρείαν³
 μὲν μάλιστα καὶ δειλίαν, ἔπειτα καὶ πρὸς πραό-

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in the bees both the drones and the kings^a are stingless, and certain of the wasps are stingless, as we have said before.^b But the anthrenas are all seen to have stings. But further enquiry is necessary in fact about the leader, as to whether he has a sting or not.

The bumble-bees give birth under a stone on the actual ground, in two cells or a little more; and in these there is also found the beginnings of honey of a poor sort. XLIII

The tenthredon resembles the anthrena but is variegated and its flatness is like the bee. Being greedy, it flies individually on to confectioneries and fish and delicacies of that sort. It gives birth underground like the wasps, and is prolific; the tenthredon-nest is much bigger than that of the wasps and more elongated.

This then is the manner of work and life of the bees and the wasps and the others of that sort.

With regard to the characters of the animals, as we have said^c previously too, it is possible to observe differences, chiefly in respect of courage and cowardice, but secondly also in respect of gentleness and XLIV

^a Contrast 628b2.

^b 628b3.

^c VII(VIII) 588a21, VIII(IX) 608a15, 610b20.

¹ *τερθρίνιον* β E^a P K^c M^c: *τερθρήνιον* L^c Ald.: *τερθρινόν* n

² om. β Guil.

³ *ἀνδρίαν* S^c E^a L^c n Ald. Bk.

τητα καὶ ἀγριότητα καὶ αὐτῶν τῶν ἀγρίων.

- καὶ γὰρ ὁ λέων ἐν τῇ βρώσει μὲν χαλεπώτα-
 τός ἐστι, μὴ πεινῶν δὲ καὶ βεβρωκῶς πραότα-
 10 τος. ἔστι δὲ τὸ ἦθος οὐχ ὑπόπτῃς οὐδενὸς οὐδ'
 ὑφορώμενος οὐδέν, πρὸς τε τὰ σύντροφα καὶ
 συνήθη σφόδρα φιλοπαίγμων καὶ στερκτικός. ἐν
 δὲ ταῖς θήραις ὀρώμενος μὲν οὐδέποτε φεύγει
 οὐδὲ πτήσσει, ἀλλ' ἐὰν καὶ διὰ πλῆθος ἀναγκα-
 σθῇ τῶν θηρευόντων ὑπαγαγεῖν¹ βάδην ὑπο-
 15 χωρεῖ καὶ κατὰ σκέλος καὶ² κατὰ βραχὺ ἐπιστρε-
 φόμενος· ἐὰν μέντοι ἐπιλάβηται δασέος, φεύγει
 ταχέως ἕως ἂν καταστῇ εἰς φανερόν· τότε δὲ
 πάλιν ὑπάγει βάδην. ἐν δὲ τοῖς ψιλοῖς ἐὰν ποτ'
 ἀναγκασθῇ εἰς φανερόν διὰ τὸ πλῆθος φεύγειν,
 τρέχει κατατείνας καὶ οὐ πηδᾷ. τὸ δὲ δρόμημα
 20 συνεχῶς ὥσπερ κυνός ἐστι κατατεταμένον· διώ-
 κων μέντοι ἐπιρρίπτει ἑαυτὸν ὅταν ᾗ πλησίον.
 ἀληθῇ δὲ καὶ τὰ λεγόμενα, τό τε φοβεῖσθαι
 μάλιστα τὸ πῦρ, ὥσπερ καὶ Ὅμηρος ἐποίησεν
 “καιόμεναί³ τε δεταί, τάς τε τρεῖ ἐσσύμενός
 περ”, καὶ τὸ τὸν βάλλοντα⁴ τηρήσαντα ἴεσθαι

¹ ὑπάγειν β ² om. α γ Bk.

³ καιόμενας β M^ccorr.

⁴ codd. (incl. E^a) Ald. Bas.: βαλόντα Bk.

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wildness, even among the wild ones themselves.

For even the lion, although it is very dangerous while feeding, if it is not hungry and has fed is very gentle. In character it is not shy nor suspicious of anything, and towards those reared with it and familiar it is very playful and affectionate. When it is being hunted, even if it is in view it never runs away nor takes cover, but if it is compelled to withdraw because of the number of hunters it retreats at a walk, step by step,^a and turning its head at short intervals; nevertheless if it reaches thick cover it runs away fast until it has come into full view; then it again withdraws at a walk. In open country if it has been forced by the crowd to run away into full view, it runs extended and does not leap. The running gait is continuously extended like a hound's; when it is pursuing, however, it hurls itself on the prey when it is near. And what is said of it is true, both that its chief fear is of fire (as in Homer's verses^b: "and burning torches from which he turns in fear even when he is charging furiously") and that it watches for the man who is shooting and

^a "Step by step" may not adequately render *κατὰ σκέλος*, which represents a pacing gait at II 498b7. Here it may mean that the lion when creeping does not bring the legs alternately in front of each other but advances one foot and then brings the next up behind that one, as in Homer's phrase "one knee behind the other" (*Il.* 11. 547); see Sn. IV. 229.

^b Hom. *Il.* 11. 554, 17. 663.

ἐπὶ τοῦτον. ἐὰν δέ τις βάλλῃ μὲν, μὴ¹ ἐνοχλῇ
 25 δὲ αὐτόν, ἐὰν ἐπαίξας συλλάβῃ, ἀδικεῖ μὲν οὐδὲν
 οὐδὲ βλάπτει τοῖς ὄνυξι, σείσας δὲ καὶ φοβήσας
 ἀφίησι πάλιν. πρὸς δὲ τὰς πόλεις ἔρχονται
 μάλιστα καὶ τοὺς ἀνθρώπους ἀδικοῦσιν ὅταν
 γένωνται πρεσβῦται, διὰ τε τὸ γῆρας ἀδύνατοι
 30 θηρεύειν ὄντες καὶ διὰ τὸ πεπονθηκέναι τοὺς ὀδόν-
 τας. ἔτη δὲ ζῶσι πολλά, καὶ ὁ ληφθεὶς λέων
 χωλὸς πολλοὺς τῶν ὀδόντων εἶχε κατεαγότας, ᾧ
 τεκμηρίῳ ἐχρῶντό τινες ὅτι πολλά ἔτη ζῶσιν.
 τοῦτο γὰρ οὐκ ἂν συμπεσεῖν² μὴ πολυχρονίῳ
 ὄντι. γένη δ' ἐστὶ λεόντων³ δύο· τούτων δ' ἐστὶ
 τὸ μὲν στρογγυλώτερον⁴ καὶ οὐλοτριχώτερον δει-
 35 λότερον, τὸ δὲ μακρότερον καὶ εὐτριχον⁵ ἀνδρεϊό-
 630a τερον.⁶ φεύγουσι δ' ἐνίοτε κατατείναντες τὴν
 κέρκον ὥσπερ κύνες. ἤδη δ' ὥπται λέων καὶ ὑὶ
 ἐπιτίθεσθαι μέλλων, καὶ ὥς εἶδεν ἀντιφρίξαντα⁷
 φεύγων. ἔστι δὲ πρὸς τὰς πληγὰς εἰς μὲν τὰ
 κοῖλα ἀσθενής, κατὰ δὲ τὸ ἄλλο σῶμα δέχεται
 5 πολλὰς καὶ κεφαλὴν ἔχει ἰσχυράν. ὅσα δ' ἂν

¹ interpunx. post μὴ Gaza Sylb. Sn. Bk.

² συμπέση β (abbrev. incert. D^a) L^c Ald.

³ τῶν λ. β ⁴ -ότερον β γ Ald.

⁵ codd. Ald.: εὐθύτριχον Bas. edd.: asperi pili Scot. Alb.:

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then rushes upon that one. And if one shoots without hurting it,^a then if it can catch him by springing on him it does not injure him nor wound him with its claws, but after shaking and frightening him it lets him go again. They approach the towns and injure humans mostly after they have grown old, being unable to hunt because of their age and because their teeth have suffered. They live many years, and the lion that was captured lame had many of its teeth broken, which some used as evidence that they have many years of life, arguing that it could not have developed this condition except over a long period. There are two kinds of lions; of these the one with the more rounded body and curlier hair is more cowardly, while the longer one with good hair is braver. Sometimes they run away stretching the tail straight out like hounds. A lion has been seen before now about to attack a pig, and running away when it saw it bristling in defence. Against blows to the flanks it is weak, but it can take many over the rest of its body and its head is strong. Whatever it has bitten or wounded

^a Or, as punctuated by Gaza and some edd., "if one does not shoot at it but annoys it". The negative is taken with ἐνοχλῆ (as here) by Guil., Trap., Ael. V 39.

recti pili Guil. Trap.: *pilo probiore* Gaza

⁶ ἀνδρ. καὶ β L^c rec. Ald.

⁷ α Trap. Gaza Ott. Bk.: ἀντιφράξαντα C^a β γ Guil.: ἀναφράξαντα L^c Ald.

δάκη ἢ τοῖς ὄνυξιν ἐλκώσῃ, ἐκ τῶν ἐλκῶν ἰχώρες
 ῥέουσιν ὠχροὶ σφόδρα καὶ ἐκ τῶν ἐπιδέσμων καὶ
 σπόγγων ὑπ' οὐδενὸς δυνάμενοι ἐκκλύζεσθαι· ἡ
 δὲ θεραπεία ἡ αὐτὴ καὶ τῶν κυνοδήκτων ἐλκῶν.

- φιλάνθρωποι δ' εἰσὶ καὶ οἱ θῶες καὶ οὗτ' ἀδι-
 10 κοῦσι τοὺς ἀνθρώπους οὔτε φοβοῦνται σφόδρα,¹
 πολεμοῦσι δὲ τοῖς κυσὶ καὶ τοῖς λέουσιν· διὸ ἐν
 τῷ αὐτῷ τόπῳ οὐ γίνονται. ἄριστοι δ' οἱ μικροὶ
 τῶν θῶων. γένη δ' αὐτῶν οἱ μὲν φασιν εἶναι
 δύο, οἱ δὲ τρία· οὐ δοκεῖ δὲ πλείω εἶναι, ἀλλ'
 ὥσπερ τῶν ἰχθύων καὶ τῶν ὀρνέων καὶ τῶν
 15 τετραπόδων ἓνια, καὶ οἱ θῶες μεταβάλλουσι
 κατὰ τὰς ὥρας, καὶ τό τε χρῶμα ἕτερον τοῦ χει-
 μῶνος καὶ τοῦ θέρους ἴσχουσι, καὶ τοῦ μὲν θέρους
 λεῖοι γίνονται τοῦ δὲ χειμῶνος δασεῖς.

- XLV ὁ δὲ βόνασος² γίνεται μὲν ἐν Παιονίᾳ ἐν τῷ
 ὄρει τῷ Μεσσαπίῳ ὃ ὀρίζει τὴν Παιονικὴν καὶ
 20 τὴν Μαιδικὴν χώραν· καλοῦσι δ' αὐτὸν οἱ Παί-
 ονες μόναπον. τὸ δὲ μέγεθός ἐστιν ἡλίκον ταῦ-
 ρος, καὶ ἔστιν ὀγκωδέστερον ἢ βοῦς· οὐ γὰρ πρό-
 μηκές ἐστιν. τὸ δὲ δέρμα αὐτοῦ κατέχει εἰς
 ἐπτάκλινον ἀποταθέν.³ καὶ τὸ ἄλλο δὲ εἶδος
 ὅμοιον βοί, πλὴν χαίτην ἔχει μέχρι τῆς ἀκρωμίας

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with its claws, the wounds run with ichors which are deep yellow and cannot be washed out of the bandages and sponges. The treatment is the same as for wounds caused by dogbite.

The thos^a too are friendly to man; they neither harm humans nor fear them greatly, but they are at war with dogs and lions and therefore do not occur in the same place. The small ones are the best. Some say there are two kinds of thos, others say three; but it seems that there are not several kinds but like certain fishes and birds and quadrupeds the thos too change according to the seasons, and get a different colour in winter and in summer, and in summer become smooth but in winter shaggy.

The bison occurs in Paeonia on the Messapian mountain which marks the boundary between the Paeonian and the Maedican country.^b The Paeonians call the animal monapos. Its size is that of a bull; it is more bulky than the ox, for it is not elongated. Its skin when stretched out covers a seven-seat dining-room. Its form is generally like an ox except that it has a mane down to the shoulder

XLV

^a Variouslly identified as jackal, civet, stoat, but no identification fits all of Arist.'s reports: see Peck's additional note on VI 580a26, Vol. II p. 377.

^b Paeonia in northern Macedonia, Maedica on the border of Thrace; cf. II 500a1, *Mirab.* 1 830a5 ff.

¹ σφόδρα φοβ. transp. β

² βόνασσοις C^a β L^crec. m Guil. Ald.: βόνασσοις A^a G^arec. Q

³ διατεθέν β L^crec.: *distensa* Guil.: *distentum* Gaza

- 25 ὥσπερ ἵππος· μαλακωτέρα δ' ἢ θρίξ τῆς τοῦ
 ἵππου καὶ προσεσταλμένη μᾶλλον. χρῶμα δ'
 ἔχει τοῦ τριχώματος ξανθόν· βαθεῖα δὲ καὶ μέχρι
 τῶν ὀφθαλμῶν καθήκουσα ἡ χαίτη ἐστὶ καὶ
 πυκνή· τὸ δὲ χρῶμα ἔχει μέσον τι τεφροῦ καὶ
 πυρροῦ, οὐχ οἶον αἱ παρῶαι ἵπποι καλούμεναι·
 30 ἀλλ' αὐχμηροτέραν τὴν τρίχα, κάτωθεν ἐριώδη·
 μέλανες δ' ἢ πυρροὶ σφόδρα οὐ γίνονται. φωνὴν
 δ' ὁμοίαν ἔχουσι βοί, κέρατα δὲ γαμφά, κεκαμ-
 μένα πρὸς ἄλληλα καὶ ἄχρηστα πρὸς τὸ ἀμύνε-
 σθαι,¹ τῷ μεγέθει σπιθαμιαῖα ἢ μικρῷ μείζω,
 πάχος δ' ὥσπερ² χωρῆσαι μὴ πολλῷ ἔλαττον
 35 ἡμίχου³ ἑκάτερον· ἢ δὲ μελανία καλὴ καὶ λιπαρὰ
 630b τοῦ κέρατος. τὸ δὲ προκόμιον καθήκει ἐπὶ τοὺς
 ὀφθαλμούς, ὥστ' εἰς τὸ πλάγιον παρορμᾶν⁴
 μᾶλλον ἢ εἰς τὸ πρόσθεν. ὀδόντας δὲ τοὺς ἄνω-
 θεν οὐκ ἔχει, ὥσπερ οὐδὲ βοῦς οὐδ' ἄλλο τῶν
 κερατοφόρων οὐδέν, σκέλη δὲ δασέα· καὶ ἐστὶ
 διχαλόν·⁵ κέρκον δ' ἐλάττω ἢ κατὰ τὸ μέγεθος,
 5 ὁμοίαν τῇ τοῦ βοός. καὶ ἀναρρίπτει τὴν κόνιν
 καὶ ὀρύττει ὥσπερ ταῦρος. δέρμα δ' ἔχει πρὸς
 τὰς πληγὰς ἰσχυρόν. ἐστὶ δ' ἡδύκρεων, διὸ καὶ
 θηρεύουσιν αὐτό. ὅταν δὲ πληγῇ φεύγει, καὶ

¹ ἀμύνασθαι β

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like a horse; but the hair is softer than the horse's and lies closer. The colour of the hair is fair and the mane is deep, reaching down to the eyes, and thick. But the animal's colour is a mean between ashen and red, unlike the horses called paroan; its hair however is rather rough and down below^a it is woolly. They do not occur as black nor as very red. Their voice is like an ox; their horns are crooked, curved towards each other and not useful for defence, in size a span or a little more, in thickness such as to hold not much less than a half-pitcher each; the horn's dark colour is beautiful and shiny. The forelock reaches down to the eyes, so that the animal moves off to one side rather than to the front. It lacks the upper teeth, like the ox and all horned animals; its legs are shaggy; it is cloven-hoofed; its tail is too small in proportion to its size, and resembles that of the ox. It throws up the dust and digs like a bull. Its skin is strong in resisting blows. Its meat is pleasant, and therefore they hunt it. On being hit, it runs away; it stands to meet

^a Th. takes this to be the undercoat, others the underbelly.

² ὥστε L^cpr. Ald. edd.

³ β L^crec. Dt. (cf. *Mirab.* 830a14): ἡμιχοῦν α γ Ald. Bk.

⁴ codd. Ald. Scal. A.-W.: παρορᾶν Bas. Bk. Dt.: respiciat Guil.: descendit Trap.: pendeant Gaza

⁵ διχηλόν β E^arec. Prec.

ὑπομένει ὅταν ἐξαδυνατῇ.¹ ἀμύνεται δὲ λακτίζων
καὶ προσαφοδεύων καὶ εἰς τέτταρας ὀργυιάς ἀφ'
10 ἑαυτοῦ ῥίπτων· ῥαδίως δὲ χρήται τούτῳ καὶ
πολλάκις, καὶ ἐπικαίει ὥστε ἀποψήχεσθαι² τὰς
τρίχας τῶν κυνῶν. τεταραγμένου μὲν οὖν καὶ
φοβουμένου τοῦτο ποιεῖ ἢ κόπρος, ἀταράκτου δ'
ὄντος οὐκ ἐπικαίει. ἢ μὲν οὖν ἰδέα τοῦ θηρίου
καὶ ἢ φύσις τοιαύτη τίς ἐστίν. ὅταν δ' ὥρα ᾗ
15 τοῦ τίκτειν, ἀθρόοι τίκτουςιν ἐν τοῖς ὄρεσιν. περὶ
δὲ τὸν τόπον ἀφοδεύουσι πρότερον πρὶν τεκεῖν,
καὶ ποιοῦσιν οἶον περίβολον· προίεται γὰρ τὸ
θηρίον πολὺ τι πλῆθος τούτου τοῦ περιττώματος.

XLVI πάντων δὲ τιθασσότατον καὶ ἡμερώτατον τῶν
ἀγρίων ἐστὶν ὁ ἐλέφας· πολλὰ γὰρ καὶ παιδεύ-
20 εται καὶ ξυνίησιν, ἐπεὶ καὶ προσκυνεῖν διδάσκον-
ται τὸν βασιλέα. ἔστι δὲ καὶ εὐαίσθητον καὶ τῇ
συνέσει τῇ ἄλλῃ ὑπερβάλλον. ὃ δ' ἂν ὀχεύσῃ καὶ
ἔγκυον ποιήσῃ, τούτου πάλιν οὐχ ἄπτεται. ζῆν
δέ φασι τὸν ἐλέφαντα οἱ μὲν ἔτη διακόσια, οἱ δ'
ἐκατὸν εἴκοσι, καὶ τὴν θήλειαν ἴσα σχεδὸν τῷ
25 ἄρρενι, ἀκμάζειν δὲ περὶ ἔτη ἑξήκοντα, πρὸς δὲ
τοὺς χειμῶνας καὶ τὰ ψύχη δύσριγον εἶναι. ἔστι

¹ C^a β γ Ald. Dt. (cf. Mirab. 830a17): ἐξατονῇ α Ott. Bk.

² ἀποψύχεσθαι α β L^c Ald.

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them when it has lost strength. It defends itself by kicking and by voiding dung at them, throwing it up to four rods^a from itself; it uses this easily and frequently, and it scorches the hounds' coats so that they rub off. Now it is when the bison is distressed and frightened that its dung does this, but when it is free from distress it does not scorch. Such then is the beast's form and nature. When it is time to give birth, they give birth in a group in the mountains. They first drop dung around the place before giving birth, and make a sort of rampart; for the beast discharges a great quantity of this residue.

The tamest and gentlest of all the wild animals is the elephant, for there are many things that it both learns and understands: they are even taught to kneel before the king. It has quick perception and superior understanding in other respects. After mating with one and making it pregnant it does not touch that one again.^b Some say the elephant lives two hundred years, others one hundred and twenty,^c and that the female lives about the same number of years as the male, and that its prime is at about sixty years, and that it does not stand the cold well in the face of winter weather and frosts. The

XLVI

^a A rod is the span of both arms outstretched; see Appendix.

^b Same at V 546b10.

^c Different figures at VII(VIII) 596a11, which is followed by Pliny VIII 10. 28.

δὲ τὸ ζῶον παραποτάμιον, οὐ ποτάμιον· ποιεῖται
 δὲ καὶ διὰ τοῦ ὕδατος τὴν πορείαν, ἕως τούτου δὲ
 προέρχεται ἕως ἂν ὁ μυκτὴρ ὑπερέχῃ αὐτοῦ·
 ἀναφυσᾷ γὰρ διὰ τούτου καὶ τὴν ἀναπνοὴν ποιεῖ-
 30 ται. νεῖν δ' οὐ πάνυ δύναται διὰ τὸ τοῦ σώματος
 βάρος.

XLVII οἱ δὲ κάμηλοι οὐκ ἀναβαίνουνσιν ἐπὶ τὰς μητέ-
 ρας, ἀλλὰ κἂν βιάζηται τις οὐ θέλουσιν. ἤδη
 γάρ ποτε ἐπεὶ οὐκ ἦν ὀχεῖον, ὁ ἐπιμελητὴς περι-
 καλύψας τὴν μητέρα ἐφῆκε τὸν πῶλον· ὥς δ'
 35 ὀχεύσαντος ἀπέπεσε, τότε μὲν ἀπετέλεσε τὴν
 συνουσίαν, μικρὸν δ' ὕστερον δακὼν τὸν καμηλί-
 631a τιν ἀπέκτεινεν. λέγεται δὲ καὶ τῷ Σκυθῶν
 βασιλεῖ γενέσθαι ἵππον γενναίαν, ἐξ ἧς ἀπάντας
 ἀγαθοὺς γίνεσθαι τοὺς ἵππους· τοῦτον¹ ἐκ τοῦ
 ἀρίστου βουλόμενον γεννῆσαι ἐκ τῆς μητρὸς
 προσάγειν² ἵν' ὀχεύσῃ· τὸν δ' οὐ θέλει· περι-
 5 καλυφθείσης δὲ λαθόντα ἀναβῆναι· ὥς δ' ὀχεύ-
 σαντος ἀπεκαλύφθη τὸ πρόσωπον τῆς ἵππου,
 ἰδόντα τὸν ἵππον φεύγειν καὶ ῥῖψαι ἑαυτὸν κατὰ
 τῶν κρημνῶν.

XLVIII τῶν δὲ θαλασσίων πλείστα λέγεται σημεῖα
 περὶ τοὺς δελφῖνας πραότητος καὶ ἡμερότητος,

¹ τούτων L^c Ald. Guil. Gaza edd.

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animal lives beside rivers but is not a river animal. But it makes its way even through water and goes on so long as its trunk reaches above it; for it blows and draws its breath through this. But it cannot swim much, because of the weight of its body.

Camels do not cover their mothers, but refuse even if force is used. For on one occasion, when there was no stallion, the keeper put the mother's colt to her, after putting a wrap over her; when it fell away after the mating, by then he had completed the intercourse, but a little later he bit the camel-man to death. It is said too that the king of the Scythians had a high-quality^a mare all of whose colts were good; the king, wishing to breed from the best out of the mother, brought it to her to mate; but it refused; but after she had been concealed under a wrap it mounted her in ignorance; and when the mare's face was uncovered after the mating, at sight of her the horse ran away and threw itself down the cliffs. XLVII

Among the sea animals much evidence of mildness and gentleness is reported of the dolphins, in XLVIII

^a γενναῖος means that the animal is not only well bred but is true to its breeding, as distinct from εὐγενής, which means merely 'well-bred' (I 488b18, *Rhet.* 1390b22). This mare had "class". Common horses covered their own dams according to VI 576a18.

² β E^a P K^c M^c Guil. Dt. (cf. Antig. 59): προσαγαγεῖν L^c m n Ald. edd.: ἄγειν α

- 10 καὶ δὴ καὶ πρὸς παῖδας ἔρωτες καὶ ἐπιθυμίαι καὶ
περὶ Τάραντα καὶ Καρίαν καὶ ἄλλους τόπους.
καὶ¹ περὶ Καρίαν δὲ² ληφθέντος δελφίνος καὶ
τραύματα λαβόντος ἀθρόον ἐλθεῖν λέγεται πλη-
θος δελφίνων εἰς τὸν λιμένα μέχρι περ ὁ ἁλιεύς
ἀφῆκεν· τότε δὲ πάλιν ἅμα πάντες ἀπῆλθον.
- 15 καὶ τοῖς μικροῖς δελφῖσιν ἀκολουθεῖ τις αἰὲ τῶν
μεγάλων φυλακῆς χάριν. ἤδη δ' ὥπται δελφί-
νων μεγάλων ἀγέλη ἅμα καὶ μικρῶν· τούτων δ'
ἀπολειπόμενοί τινες δύο οὐ πολὺ ἐφάνησαν
δελφινίσκον μικρὸν τεθνηκότα, ὅτ' εἰς βυθὸν
φέρειτο, ὑπονέοντες καὶ μετεωρίζοντες τῷ νώτῳ
- 20 οἷον κατελεοῦντες, ὥστε μὴ καταβρωθῆναι ὑπὸ
τινος τῶν ἄλλων θηρίων. λέγεται δὲ καὶ περὶ
ταχυτήτος ἄπιστα τοῦ ζώου· ἀπάντων γὰρ δοκεῖ
εἶναι³ ζώων τάχιστον καὶ τῶν ἐνύδρων καὶ τῶν
χερσαίων, καὶ ὑπεράλλονται δὲ πλοίων μεγάλων
ἱστούς. μάλιστα δὲ τοῦτ' αὐτοῖς συμβαίνει ὅταν
- 25 διώκουσί τινα ἰχθὺν τροφῆς χάριν· τότε γὰρ ἐὰν
ἀποφεύγῃ συνακολουθοῦσιν εἰς βυθὸν διὰ τὸ πει-
νῆν, ὅταν δ' αὐτοῖς μακρὰ γίνηται ἡ ἀναστροφή,
κατέχουσι τὸ πνεῦμα ὥσπερ ἀναλογισάμενοι, καὶ
συστρέψαντες ἑαυτοὺς φέρονται ὥσπερ τόξευμα,
τῇ ταχυτήτι τὸ μῆκος διελθεῖν βουλόμενοι πρὸς

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particular their loves and passions towards boys around Tarentum and Caria and other places.^a And it was around Caria too that a large crowd of dolphins is said to have come into the harbour after a dolphin had been captured and wounded, until the fishermen let it go: and then they all went away again together. And the small dolphins are always accompanied by one of the big ones for protection. There has been seen before now a crowd of dolphins, big and small together, of which two were seen to have been left behind a little way, swimming beneath a little dead baby dolphin whenever it was sinking to the depths, and bringing it up on their backs, as though out of pity, with the result that it was not devoured by some other wild creature. There are also unreliable reports about the animal's speed; for it is held to be the fastest of all animals both on sea and on land, and in addition they leap over the masts of large ships. This happens to them chiefly when they are pursuing a particular fish for food; for then if it is escaping they follow it down to the depths because of their hunger, and when the return journey is becoming long for them they restrain their breath as though from calculation, and after drawing themselves together they go like an arrow, wishing to achieve the distance through their

^a Cf. Pliny IX 8. 24–28.

¹ om. L^c Ald. edd. ² γὰρ L^c Ald. edd.

³ εἶναι τῶν β

- 30 τὴν ἀναπνοήν, καὶ ὑπεράλλονται τοὺς ἰστοὺς ἐὰν
 παρατυγχάνῃ που πλοῖον. ταῦτ¹ δὲ ποιοῦσι καὶ
 οἱ κατακολυμβηταὶ ὅταν εἰς βυθὸν ἑαυτοὺς ἀφώ-
 σιν· κατὰ τὴν ἑαυτῶν γὰρ δύναμιν καὶ οὗτοι
 631b ἀναφέρονται συστρέψαντες. διατρίβουσι δὲ μετ'
 ἀλλήλων κατὰ συζυγίας οἱ ἄρρενες ταῖς θηλείαις.
 διαπορεῖται δὲ περὶ αὐτῶν διὰ τί ἐξοκέλλουσιν
 εἰς τὴν γῆν· ποιεῖν γάρ φασι τοῦτ' αὐτοὺς
 ἐνίοτε ὅταν τύχωσι δι' οὐδεμίαν αἰτίαν.

- XLIX ὥσπερ δὲ καὶ² τὰς πράξεις κατὰ τὰ πάθη³
 6 συμβαίνει ποιεῖσθαι πᾶσι τοῖς ζώοις, οὕτω πάλιν
 καὶ τὰ ἦθη μεταβάλλουσι κατὰ τὰς πράξεις,
 πολλάκις δὲ καὶ τῶν μορίων ἔνια, οἷον ἐπὶ τῶν
 ὀρνίθων συμβαίνει. αἷ τε γὰρ ἀλεκτορίδες ὅταν
 νικήσωσι τοὺς ἄρρενας, κοκκύζουσιν τε μιμούμεναι
 10 τοὺς ἄρρενας καὶ ὀχεύειν ἐπιχειροῦσι, καὶ τό τε
 κάλλαιον ἐξαίρεται αὐταῖς καὶ τὸ ὀρροπύγιον,⁴
 ὥστε μὴ ῥαδίως ἂν ἐπιγνῶναι ὅτι θήλειαί εἰσιν·

¹ codd. cett.: ταῦτα L^c Ald.: ταῦτὸν Bk. Dt.

² om. C^a O^ccorr. L^cpr. Guil. Gaza edd.

³ τὰς . . . πάθη] τὰ πάθη κατὰ τὰς πράξεις β L^crec. Ald.:
 κατὰ τὰ πάθη καὶ τὰς πράξεις O^ccorr. Ott.: sicut autem mores
 et operationes accidit Guil.: sed ut quaeque animalia pro

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speed in order to breathe; and if a ship happens to be near by they leap over its masts. The same is done by the divers too when they have plunged to the depths: for in proportion to their own power they too are borne upwards after drawing themselves together. Dolphins spend their time with each other in pairs, males with females. One problem about them is why they beach themselves on the land; for they are said to do this occasionally, at random times, for no cause.

XLIX

Just as it comes about for all animals that their activities accord with their occasional bodily states,^a so again their characters too change according to their activities, and often certain bodily parts change as well, such as happens in the case of birds. For domestic hens, after defeating the males, crow in imitation of the males and attempt to tread, and their crest and tail are raised so that one would not easily recognise that they are females; in some there

^a πάθος is a natural condition or affection that is not always present but is brought about by certain circumstances: e.g. III 519a3 seasonal change of birds' colour, VII(VIII) 599a6 the urge to hibernate, 600b29 sloughing, VIII(IX) 628b30 old age; cf. VI 572a15, b26, 574b3, 28, VII(VIII) 603b5, VIII(IX) 628a30, IX(VII) 588a6, X passim. Pathos and pathema are discussed by Bonitz *Ar. Stud.* V.

suis affectibus agere Gaza

⁴ οὐροπόγιον α (exc. C^a) E^a L^cpr. Ald. Bk.: δροπόγιον n

ἐνίαις δὲ καὶ πληκτρά τινα μικρὰ ἐπανεστή.
 ἤδη δὲ καὶ τῶν ἀρρένων τινὲς ὥφθησαν ἀπολο-
 μένης τῆς θηλείας αὐτοὶ περὶ τοὺς νεοττοὺς [τὴν
 15 τῆς θηλείας]¹ ποιούμενοι σκευωρίαν, περιάγοντές
 τε καὶ ἐκτρέφοντες, οὕτως ὥστε μήτε κοκκύζειν
 ἔτι μήτ' ὀχεύειν ἐπιχειρεῖν. γίνονται δὲ καὶ
 θηλυδρίαὶ ἐκ γενετῆς τῶν ὀρνίθων² τινὲς οὕτως³
 ὥστε καὶ ὑπομένειν τοὺς ἐπιχειροῦντας ὀχεύειν.

L μεταβάλλει δὲ τὰ ζῶα οὐ μόνον τὰς μορφὰς
 20 ἕνια καὶ τὸ ἦθος κατὰ τὰς ἡλικίας καὶ τὰς ὥρας
 ἀλλὰ καὶ ἐκτεμνόμενα. ἐκτέμνεται δὲ τῶν ζώων
 ὅσα ἔχει ὄρχεις. ἔχουσι δ' οἱ μὲν ὀρνίθες τοὺς
 ὄρχεις ἐντὸς καὶ τὰ ὠοτόκα τῶν τετραπόδων
 πρὸς τῇ ὀσφύϊ, τὰ δὲ ζωοτόκα καὶ περὶ τὰ μὲν
 πλείστα ἐκτός, τὰ δ' ἐντός, πάντα δὲ πρὸς τῷ
 25 τέλει τῆς γαστροῦ. ἐκτέμνονται δ' οἱ μὲν ὀρνι-
 θες κατὰ⁴ τὸ ὀροπύγιον,⁵ καθ' ὃ συμπίπτουσιν
 ὀχεύοντες· ἐνταῦθα γὰρ ἐὰν ἐπικαύσῃ τις δυσὶν
 ἢ τρισὶ σιδηρίοις, ἐὰν μὲν ἤδη τέλειον ὄντα, τό

¹ νεοτ. τὴν τῆς θηλείας α Guil. Gaza edd.

² ὀρνέων β ³ om. β ⁴ παρὰ β

⁵ οὐροπύγιον α Bk.

^a The α MSS and Latin versions add "doing the female's

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has even been an outgrowth of a sort of small spurs. And some of the males have been seen before now, after the death of the female, busying themselves about the chicks,^a leading them around and rearing them, with the result that they neither crow any more nor attempt to tread. There are also some birds that are effeminate from birth to the extent that they even submit to males attempting to tread them.^b

The animals change their forms and character L not only, in certain cases, according to their ages and the seasons, but also through being castrated. Castration can be done to any animals that have testicles. The birds and the oviparous quadrupeds have the testicles inside by the loins, while animals that are viviparous and walk mostly have them outside, though some inside, but all by the end of the belly. The birds are castrated at the rump, at the point where they come together in mating; for after cauterising them there with two or three irons, if the bird is already full-grown the crest becomes pale

duty", which has been accepted by edd. and may be authentic. On the other hand, the point is not that the male performs the female's duties (for Arist. reports this as common in many animals) but that it turns to activities which do not require specifically male attributes and consequently loses those attributes. The additional words therefore may be a later gloss that has become interpolated.

^b On the order of the text after 631b18 see Additional Notes.

- τε κάλλαιον ἔξωχρον γίνεται καὶ οὐκέτι κοκκύζει
 οὐδ' ἐπιχειρεῖ ὀχεύειν, ἔαν δ' ἔτι νεοττὸν ὄντα,
 30 οὐδὲ γίνεται τούτων οὐδὲν αὐξανομένου. τὸν
 αὐτὸν δὲ τρόπον καὶ ἐπὶ ἀνθρώπων· ἔαν μὲν γὰρ
 παῖδας ὄντας πηρώσῃ τις, οὔτε αἱ ὑστερογενεῖς
 632a ἐπιγίνονται τρίχες οὔτε ἡ φωνὴ μεταβάλλει ἀλλ'
 ὀξεῖα διατελεῖ· ἂν δ' ἤδη ἡβῶντας, αἱ μὲν ὑστε-
 ρογενεῖς τρίζες ἀπολείπουσι πλὴν τῶν ἐπὶ τῆς
 ἡβης (αὗται δ' ἐλάττους μὲν, μένουσι δέ), αἱ δ'
 ἐκ γενετῆς τρίχες οὐκ ἀπολείπουσιν· οὐδεὶς γὰρ
 5 γίνεται εὐνοῦχος φαλακρός. μεταβάλλει δὲ καὶ ἡ
 φωνὴ καὶ¹ ἐπὶ τῶν τετραπόδων τῶν ἐκτεμνομέ-
 νων ἀπάντων ἢ πηρουμένων² εἰς τὸ θῆλυ. τὰ
 μὲν οὖν ἄλλα τετράποδα ἔαν μὴ νέα ἐκτέμνηται,
 διαφθείρεται· ἐπὶ δὲ τῶν κάπρων μόνων³ οὐδὲν
 διαφέρει.⁴ πάντα δὲ ἔαν μὲν νέα ἐκτμηθῇ, μείζω
 γίνεται τῶν ἀτμήτων καὶ γλαφυρώτερα, ἔαν δὲ
 10 καθεστηκότα ἤδη, οὐκέτι αὐξάνεται ἐπὶ πλεῖον.
 οἱ δ' ἔλαφοι ἔαν μὲν μὴ πω τὰ κέρατα ἔχοντες
 διὰ τὴν ἡλικίαν ἐκτμηθῶσιν, οὐκέτι φύουσι
 κέρατα· ἔαν δ' ἔχοντας ἐκτέμῃ τις, τό τε μέγεθος
 ταυτὸν μένει τῶν κεράτων καὶ οὐκ ἀποβάλλου-
 σιν. οἱ μὲν οὖν μόσχοι ἐκτέμνονται ἐνιαύσιοι, εἰ
 15 δὲ μή, αἰσχίους καὶ ἐλάττους γίνονται.⁵ οἱ δὲ

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yellow and he no longer crows nor tries to mate, while if he is still a young bird none of these characters even develops as he grows. It is the same way with men. For if they have been mutilated as boys the later-growing hair does not develop nor does the voice change but continues high-pitched; but if they are already past puberty the later-growing hair falls out except for the pubic hair (and this diminishes but remains), but the congenital hair does not fall out; for no eunuch becomes bald. The voice changes too into the female even in all quadrupeds that are castrated or mutilated. Now while the other quadrupeds die if they are castrated when no longer young, in boars alone it makes no difference. All animals if castrated young become bigger and smoother than the uncastrated, but if their development is already complete they do not grow any more additionally. If deer are castrated when they have as yet no horns because of their age, they cease to grow horns; but if they already have them when castrated, the size of the horns remains the same and they do not cast them. Now calves are castrated as yearlings, otherwise they become uglier and smaller. The young bulls are castrated in this way:

¹ om. F^a X^c E^a L^c m n Ald. Bk.

² ἢ πηρ. β L^c rec. Ald. Guil. Dt.: om. α γ Trap. Gaza Ott. Bk. ³ μόνον β γ Ald.

⁴ διαφθείρει β γ Ald.

⁵ γίγνονται καὶ ἐλάττους transp. α (exc. C^a) Bk.

- δαμάλαι ἐκτέμνονται τὸν τρόπον τοῦτον· κατα-
κλίνοντες καὶ ἀποτέμνοντες τῆς ὀσχέας κάτωθεν
τοὺς ὄρχεις ἀποθλίβουσιν, εἶτα ἀναστέλλουσι τὰς
ρίζας ἄνω ὡς μάλιστα, καὶ τὴν τομὴν θριξὶ βύου-
σιν, ὅπως ὁ ἰχώρ ῥέῃ ἔξω· καὶ ἐὰν φλεγμαίνῃ,
20 κατακαύσαντες τὴν ὀσχέαν ἐπιπλάττουσιν.¹ οἱ δ'
ἐνόρχαι τῶν βοῶν ἐὰν ἐκτμηθῶσι, τὸ φανερόν
συγγενῶσιν.² ἐκτέμνεται δὲ καὶ ἡ καπρία τῶν
θηλειῶν ὑῶν, ὥστε μηκέτι δεῖσθαι ὀχείας ἀλλὰ
πιαίνεσθαι ταχέως. ἐκτέμνεται δὲ νηστεύσασα³
δύο ἡμέρας, ὅταν κρεμάσῃ τῶν ὀπισθίων
σκελῶν. τέμνουσι δὲ⁴ τὸ ἥττον ἢ τοῖς ἄρρεσιν οἱ
25 ὄρχεις μάλιστα φύονται· ἐνταῦθα γὰρ ἐπὶ ταῖς
μήτραις ἐπιπέφυκεν ἡ καπρία, τῆς μικρὸν⁵ ἀπο-
τέμνοντες συρράπτουσιν. ἐκτέμνονται δὲ καὶ αἱ
κάμηλοι αἱ θήλειαι, ὅταν εἰς πόλεμον χρῆσθαι
αὐταῖς βούλονται, ἵνα μὴ ἐν γαστρὶ λάβωσιν.
κέκτηνται δ' ἐνιοὶ τῶν ἄνω⁶ καμήλους καὶ τρισ-

¹ Ca β: ἐπιπλάττουσιν α γ Ald. edd.: *superemplastrant* Guil. (V): *superimplaustrant* Guil. (F): *in pulvere redacto inspergunt* Trap.: *respergunt* Gaza

² συγγενῶσιν α (exc. Ca^arec.): οὐ γεννῶσιν β: *cohabitant* Guil.: *coeunt* Trap.

³ νηστευσάσης β L^arec.: νηστεύουσα E^a P

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laying them down and cutting away part of the scrotum from below they squeeze out the testicles and then push back the roots as far up as possible, and plug the cut with hair so that the ichor may run out; and if it becomes inflamed they cauterise the scrotum and plaster over it. If bulls with developed testicles are castrated, they apparently assist in generating. Castration is done also to the kapria^a of female pigs, with the result that they no longer want to be mated but fatten quickly. After starving for two days the sow is hung up by its hind legs and castrated. They cut the lower belly, about where the testicles grow on the males; for there the kapria grows on to the wombs^b; they cut away a little of it and stitch it together. The female camels too are castrated when they wish to use them for war, so that they should not carry young. Certain people in the up-country^c possess as many as three thousand

^a Apparently refers to what are now known to be the ovaries. Pliny VIII 77. 209 *vulva recisa* implies rather that the whole uterus was removed (it was a culinary delicacy, Pliny XI 64. 210).

^b The plural suggests the horns of the uterus. μήτρα was a popular and inexact term, commonly including the whole uterus and cervix (cf. IX(VII) 583a20 note).

^c Presumably the interior of Asia.

⁴ om. F^a X^c β γ Ald.

⁵ ἡς μικρόν] ἡ σμικρόν β γ (exc. m): ἡ σμ. Ald.

⁶ ἀνωτέρων (viz. ἀνθρώπων) β γ Ald.: superiorum Guil.

30 χιλίας· θέουσι δὲ θᾶσσον τῶν Νισαίων¹ ἵππων,
 ἐὰν εἰς πολὺν² θέωσι, διὰ τὸ μέγεθος τοῦ ὀρέγμα-
 τος.³ ὅλως δὲ μακρότερα γίνεται τὰ ἐκτεμνό-
 μενα ζῶα τῶν ἀτμήτων.

ὠφελοῦνται δὲ τὰ ζῶα καὶ χαίρουσι, καὶ
 632b μηρυκάζουσιν ὥσπερ ἐσθλόντα, ὅσα μηρυκάζει.⁴
 μηρυκάζει δὲ τὰ μὴ ἀμφώδοντα,⁵ οἷον βόες καὶ
 πρόβατα καὶ αἰγες. ἐπὶ δὲ τῶν ἀγρίων οὐδέν πω
 συνῶπται ὅσα μὴ συντρέφεται ἐνίοτε οἷον ἔλα-
 φος· αὕτη δὲ μηρυκάζει. πάντα δὲ κατακείμενα
 5 μηρυκάζουσι⁶ μᾶλλον. μάλιστα δὲ τοῦ χειμῶνος
 μηρυκάζουσιν, τά τε κατ' οἰκίαν τρεφόμενα σχε-
 δὸν ἑπτὰ μῆνας τοῦτο ποιεῖ· τὰ δ' ἀγελαῖα καὶ
 ἥττον καὶ ἐλάττονα χρόνον μηρυκάζει διὰ τὸ
 νέμεσθαι ἔξω. μηρυκάζει δὲ καὶ τῶν ἀμφωδόν-
 των⁷ ἔνια, οἷον οἳ τε μύες οἱ Ποντικοὶ καὶ οἱ
 10 ἰχθύες καὶ ὃν καλοῦσιν ἔνιοι ἀπὸ τοῦ ἔργου
 μήρυκα.

¹ νησαίων C^a β E^a K^c: νησσαίων A^apr. G^a Q F^a X^c: νισαίων
 A^acorr. M^c: νησιβαίων Ppr.: *equi qui dicuntur nicha* Scot.:
 om. Alb.: *equis insularum* Guil.

² ἐὰν εἰς πολὺν β L^crec.: πολὺ ἐὰν α γ Ald. edd.: πολλοὶ ἐὰν
 m: *citius . . . si currunt* Guil.

³ ὀρέγματος α β L^crec.

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camels; they run faster than the Nisaeana^a horses if the distance is long, because of the length of their stride. In general castrated animals grow to a greater length than the uncastrated.

All animals that ruminate get benefit and pleasure, and ruminate as if eating. Ruminants include those that have not both rows of teeth, for example cattle, sheep and goats. In the wild animals nothing has yet been observed except in those that are sometimes reared domestically, for example deer; and this does ruminate. All tend to lie down when ruminating. They ruminate most in winter, and those fed domestically do it for practically seven months; but those in herds ruminate less and over a shorter period because they forage outside. Certain animals with both rows of teeth ruminate too, for example the Pontic mice^b and the fishes (that is, the one that some call 'the ruminant'^c from this action).

^a Reputedly the fastest and largest horses; cf. Hdt. VII 40 (Rawlinson's note); W. Ridgeway, *Origin and Influence of the Thoroughbred Horse*, 1905, 192.

^b VII(VIII) 600b14 note.

^c The skaros, parrot-wrasse, which Arist. habitually says is the only fish that ruminates (cf. II 508b11, VII(VIII) 591b22, PA III 675a3).

⁴ ὅσα μηρυκάζει om. L^{pr}. Ald.: μηρυκάζονται (om. ὅσα) β
L^{rec}.

⁵ ἀμφόδοντα β

⁶ μηρυκάζει β

⁷ ἀμφόδόντων β

ἔστι δὲ τὰ μὲν μακροσκελῇ τῶν ζώων ὑγροκοίλια, τὰ δ' εὐρυστήθη ἐμετικά μᾶλλον, καὶ ἐπὶ τῶν τετραπόδων καὶ ἐπ' ὀρνίθων καὶ ἐπ' ἀνθρώπων ὡς ἐπὶ τὸ πολὺ.

- XLIXB τῶν δ' ὀρνέων πολλὰ μεταβάλλουσι κατὰ τὰς
- 15 ὥρας καὶ τὸ χρῶμα καὶ τὴν φωνήν, οἷον ὁ κόττυφος ἀντὶ μέλανος ξανθός, καὶ τὴν φωνὴν ἴσχει ἀλλοίαν· ἐν μὲν γὰρ τῷ θέρει ἄδει, τοῦ δὲ χειμῶνος παταγεῖ καὶ φθέγγεται θορυβῶδες. μεταβάλλει δὲ καὶ ἡ κίχλη τὸ χρῶμα· τοῦ μὲν γὰρ χειμῶνος ψαρά τοῦ δὲ θέρους ποικίλα τὰ περὶ τὸν
- 20 αὐχένα ἴσχει· τὴν μέντοι φωνὴν οὐδὲν μεταβάλλει. ἡ δ' ἀηδὼν ἄδει μὲν συνεχῶς ἡμέρας καὶ νύκτας δεκαπέντε ὅταν τὸ ὄρος ἤδη δασύνηται· μετὰ δὲ ταῦτα ἄδει μὲν, συνεχῶς δ' οὐκέτι. τοῦ δὲ θέρους προιόντος ἄλλην ἀφήσι φωνὴν καὶ οὐκέτι παντοδαπὴν οὐδὲ τραχείαν καὶ ἐπιστρεφῇ
- 25 ἀλλ' ἀπλὴν, καὶ τὸ χρῶμα μεταβάλλει, καὶ ἔν γε Ἰταλίᾳ τὸ ὄνομα ἕτερον καλεῖται περὶ τὴν ὥραν ταύτην. φαίνεται δ' οὐ πολὺν χρόνον· φωλεῖ γάρ. μεταβάλλουσι δὲ καὶ οἱ ἐρίθακοι καὶ

^a Cf. 617a1 note; it does not imply an abnormal condition nor 'loose bowels', but a constitutional state.

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The long-legged animals have watery stomachs,^a whereas the broad-chested tend more to vomit, in the case of both quadrupeds and birds and humans for the most part.

Among the birds many change both colour and voice according to the seasons, for example the blackbird becomes fair^c instead of dark and its voice becomes different; for in the summer it sings but during the winter its call is a noisy clatter. The thrush too changes its colour; for in winter its neck parts are dappled but in summer they become variegated; but it has no change of voice. The nightingale sings continuously for fifteen days and nights when the mountain vegetation is already getting thick; after this it sings, but no longer continuously. As the summer advances it produces its voice differently, no longer varied and uneven and flexible but plain, and changes its colour, and in Italy in fact it is called by another name about this season. It is not seen for long, for it goes into hiding.^d The erithacus and the so-called phoinikouros also

XLIX B¹

^b On the order of the text after 631b18 see Additional Notes.

^c Used for colours ranging from yellow to brown (LSJ). Ael. XII 28 reports the same change as *ὑπόξανθος* ("yellowish"), from which Dt. suggests that the *α* reading here *ἐξανθος* might represent an original *ἐκξανθος* ("off-yellow"). Pliny X 42. 80 has *rufescit*, "reddens", followed by *Gaza rufa*. Ancient colour-words are notoriously vague.

^d From autumn to spring according to V 542b27.

οἱ καλούμενοι φοινίκουροι ἐξ ἀλλήλων· ἔστι δ' ὁ
 μὲν ἐρίθακος χειμερινόν, οἱ δὲ φοινίκουροι θερινοί,
 30 διαφέρουσι δ' ἀλλήλων οὐθὲν ὥς εἰπεῖν ἀλλ' ἢ
 τῇ χροᾷ μόνον. ὡσαύτως δὲ καὶ αἱ συκαλλίδες¹
 καὶ οἱ μελαγκόρυφοι· καὶ γὰρ οὗτοι μεταβάλλου-
 σιν εἰς ἀλλήλους. γίνεται δ' ἡ μὲν συκαλλὶς²
 περὶ τὴν ὀπώραν, ὁ δὲ μελαγκόρυφος εὐθέως
 633a μετὰ τὸ φθινόπωρον. διαφέρουσι δὲ καὶ οὗτοι
 οὐθὲν ἀλλήλων πλὴν τῇ χροᾷ καὶ τῇ φωνῇ. ὅτι
 δ' ὁ αὐτός ἐστιν ὄρνις, ἥδη ὥπται περὶ τὴν
 μεταβολὴν ἑκάτερον τὸ γένος τοῦτο, οὐπω δὲ
 τελέως μεταβεβληκότα οὐδ' ἐν θατέρῳ εἶδει
 5 ὄντα. οὐδὲν δ' ἄτοπον εἰ ἐπὶ τούτων αἱ φωναὶ
 μεταβάλλουσιν ἢ τὰ χρώματα, ἐπεὶ καὶ ἡ φάττα
 τοῦ μὲν χειμῶνος οὐ φθέγγεται (πλὴν ἥδη
 ποτὲ εὐδίας ἐκ χειμῶνος σφοδροῦ γενομένης
 ἐφθέγγετο καὶ ἐθαυμάσθη³ ὑπὸ τῶν ἐμπίρων),
 ἀλλ' ὅταν ἔαρ γένηται τότε ἄρχεται φωνεῖν. τὸ
 10 δ' ὅλον τὰ ὄρνεα καὶ μάλιστα καὶ πλείστας
 ἀφίησι φωνὰς ὅταν ᾧσι περὶ τὴν ὀχέαν. μετα-
 βάλλει δὲ καὶ ὁ κόκκυξ καὶ⁴ τὸ χρῶμα, καὶ τῇ
 φωνῇ οὐ σαφηνίζει, ὅταν μέλλῃ ἀφανίζεσθαι·
 ἀφανίζεται δ' ὑπὸ κύνα, φανερός δὲ γίνεται ἀπὸ

¹ συκαλλίδες a (exc. C^a) Bk. ² συκαλλὶς a (exc. C^a) Bk.

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change out of each other^a; the erithacus is a winter bird, the phoinikouros a summer bird, and they differ from each other in virtually no respect except in colour alone. Similarly the beccafico and the black-cap: these too change into each other. The beccafico occurs about the fruit season and the black-cap immediately after the autumn. These too differ from each other in no respect except colour and voice. That they are the same bird has been shown by observing each kind at the time of the change, when they have not yet completely changed and are not in one or the other form. It is in no way anomalous if the voices or colours change in these cases, since even the wood pigeon has no call in the winter (except that sometimes before now, when fine weather has followed very wintry weather, it has called and surprised the experts), but when spring has come it then begins to have a voice. In general the birds produce most voice, and with most variety, when they are concerned with mating. The cuckoo too changes its colour as well as losing its distinct voice when it is about to disappear; it disappears at the time of the dog-star, and

^a Erithakos is the European robin (*Erithacus*) according to Th. G.G.B., but Sundevall makes it the redstart (*Luscinia*). Phoinikouros, "red-tail", is agreed to be the redstart.

³ ἐθαυμαστώθη C^a Bk. Dt.

⁴ om. L^c Ald. Bk.

ARISTOTLE

15 τοῦ ἕαρος ἀρξάμενος μέχρι κυνὸς ἐπιτολῆς.
 ἀφανίζεται δὲ καὶ ἦν καλοῦσί τινες οἰνάνθην ἀνί-
 σχοντος τοῦ σειρίου, δυομένου δὲ φαίνεται.¹
 φεύγει γὰρ² ὅτε μὲν τὰ ψύχη ὅτε δὲ τὴν ἀλέαν.
 μεταβάλλει δὲ καὶ ὁ ἔποψ τὸ χρώμα καὶ τὴν
 ἰδέαν, ὥσπερ πεποίηκεν Αἰσχύλος ἐν τοῖσδε·

20 τοῦτον δ' ἐπόπτην ἔποπα τῶν αὐτοῦ κακῶν
 πεποικίλωκε, καὶ ἀποδηλώσας³ ἔχει
 θρασὺν πετραῖον ὄρνιν ἐν παντευχία,
 ὃς ἦρι μὲν φαίνοντι διαπάλλει πτερόν
 κίρκου λεπάργου.⁴ δύο γὰρ οὖν μορφὰς φανεῖ,⁵
 παιδὸς τε καὶ αὐτοῦ⁶ νηδύος μιᾶς ἄπο.

¹ G^arec. Q β M^c L^rrec. Guil. Gaza Ald. edd.: φεύγει α
 Prec.: φεύγεται Ppr. K^c: φθέγγεται E^a L^rpr. n

² β L^rrec. Guil. Gaza Dt.: δὲ α γ Ald. Bk.

³ καὶ ἀποδ. codd. Ald.: καποδ. edd.

⁴ λεπαργού α: δ' ἐπάργου β L^rrec. Ald.

⁵ φαίνει α β L^c Ald.

⁶ codd.: αὐτοῦ Ald.: χαυτοῦ edd.

^a Aesch. fr. 304 Nauck², but attributed by some to the lost *Tereus* of Sophocles (see the Loeb Aeschylus, H. W. Smyth ed., fr. 165).

^b In the legend, Tereus married Procne and had a son Itys; later he seduced Procne's sister Philomela and cut out her tongue; Procne killed Itys and served up his flesh in a

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becomes visible first in spring until the rising of the dog-star. The bird that some call oinanthe also disappears as Sirius rises, but appears as it sets; for it avoids at one time the cold and at the other time the heat. The hoopoe too changes its colour and its form, as Aeschylus wrote in these verses^a:

This bird, the hoopoe, which presides over its
own evils,^b
he has adorned with varied colours and has
displayed
as a bird of the rocks, bold in full panoply,
who when spring reveals him spreads the wing
of a white-feathered hawk. For he will show two
forms
from a single womb, the young one's and his own.

dish to Tereus, who then pursued both sisters with an axe. Zeus interrupted their quarrel by turning all three into birds, Philomela and Procne into nightingale and swallow (or vice versa in another version) and Tereus into a hoopoe (or a hawk); the hoopoe's song thereafter was a lament for his misdeeds and sufferings. See Ovid *Metam.* VI 671; Plato *Phaedo* 85A. The poet has combined two versions of the myth by making the old hoopoe turn into a young hawk each spring. The word ἐπόπτην, no doubt chosen for its likeness to ἐποπα, means a supervisor, especially an official at the mysteries. While it implies that Tereus witnessed his own evils, it does not have the sense of a testifying witness that some edd. give it, but rather of one who observes and presides over what takes place and is therefore responsible for it.

25 νέας δ' ὀπώρας ἤνικ' ἂν ξανθῇ στάχυσ,
 στικτὴ νιν αὖθις¹ ἀμφινωμήσει² πτέρυξ.
 αἰὲ δὲ μίσει τῶνδ' ἅπ' ἄλλον εἰς τόπον
 δρυμοὺς ἐρήμους καὶ πάγους ἀποικίσει.

εἰσὶ δὲ τῶν ὀρνίθων οἱ μὲν κονιστικοί, οἱ δὲ
 30 λούνται,³ οἱ δ' οὔτε κονιστικοὶ οὔτε λούνται.⁴
 633b ὅσοι μὲν μὴ πτητικοὶ ἀλλ' ἐπίγειοι, κονιστικοί,
 οἷον ἀλεκτορὶς⁵ πέρδιξ ἀτταγὴν⁶ κορύδαλος⁷
 φασιανός· τῶν δ' εὐθυωνύχων ἔνιοι, καὶ ὅσοι
 περὶ ποταμὸν ἢ ἔλη ἢ θάλασσαν διατρίβουσι,
 λούνται· οἱ δ' ἄμφω, καὶ κονίονται καὶ λούνται,
 5 οἷον περιστέρᾱ καὶ στρουθός· τῶν δὲ γαμψωνύ-
 χων οἱ πολλοὶ οὐδέτερον. ταῦτα μὲν οὖν τοῦτον
 ἔχει τὸν τρόπον. ἴδιον δ' ἐνίοις συμβαίνει τῶν
 ὀρνιθίων τὸ ἀποφοφεῖν, οἷον καὶ ταῖς τρυγόσιν·
 ποιοῦνται δὲ καὶ περὶ τὴν ἔδραν κίνησιν οἱ τοι-
 οῦτοι ἰσχυρὰν ἅμα τῇ φωνῇ.

¹ στικτὴ νιν αὖθις C^a: στικτῇρι μανθεῖς α: τίκτει νιν αὖθις β
 L^ccorr. Ald.: τίκτει νῦν αὖθις E^a L^cpr. n: τίκτει νῦν αὖθις K^c M^c:
 τίκτειν ἔν' αὖθις P

² ἀμφινωμήσει α: ἀμφονομήσει β: ἀμφινωμήση E^a P: ἀμφινῶν-
 μιση K^c: ἀμφὶ νῶν μήση M^c: καμφονομίση L^c Ald.: ἀμφονομίση n

³ β γ (Cf. Athen. IX.387B): λούσται α Sn. edd.: balneantes
 Guil.

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When at new harvest the corn is threshed,
 a dappled wing will cover him again.
 But ever in hatred he will go from these places to
 another
 and make his home in deserted woods and crags.

Some of the birds have dust-baths, others bathe in water, and others use neither dust nor water. Those that are not given to flying but stay on the ground have dust-baths, for example domestic hen, partridge, francolin, lark, pheasant; but certain of the straight-taloned, and all that spend their time by river or marshes or sea, bathe in water; and some have both dust-baths and water-baths, for example pigeon and sparrow; but most of the crook-taloned do neither. This then is the position in these matters. A peculiar feature in certain of the small birds is that they sound off at the rump, for example the turtle-doves; and such birds make a vigorous movement around the hindquarters at the same time as the sound.

⁴ β K^c M^c L^c m Ald. Athen.: λοῦσται α Sn. edd.: λούονται
 E^a P: *balneantes* Guil.

⁵ ἀλέκτορες β

⁶ L^c m n Ald. edd.: ἀτταγίς α β P M^c: ἀτταγής E^a: ἀττα lac.
 K^c

⁷ κορυδαλός α L^c Ald.: κορυδαλλός C^a β E^a M^c Athen.: κορύ-
 δαλλος P K^c m n

I(H)

581a

- I Περὶ δ' ἀνθρώπου¹ γενέσεως τῆς τε πρώτης
 10 τῆς² ἐν τῷ θήλει καὶ τῆς ὕστερον μέχρι γήρωσ,
 ὅσα συμβαίνει διὰ τὴν φύσιν τὴν οἰκείαν, τόνδ'
 ἔχει τὸν τρόπον. ἡ μὲν διαφορὰ τοῦ ἄρρενος
 πρὸς τὸ θῆλυ καὶ τὰ μόρια πρότερον εἴρηται,
 φέρειν δὲ σπέρμα πρῶτον³ ἄρχεται τὸ ἄρρεν ὡς
 ἐπὶ τὸ⁴ πολὺ ἐν τοῖς ἔτεσι τοῖς δις ἑπτὰ τετε-
 15 λεσμένοις· ἅμα δὲ καὶ ἡ⁵ τρίχωσις τῆς ἥβης
 ἄρχεται, καθάπερ καὶ τὰ φυτὰ τὰ⁶ μέλλοντα
 φέρειν τὸ σπέρμα⁷ ἀνθεῖ⁸ φησὶ⁹ πρῶτον Ἀλκ-
 μαίων¹⁰ ὁ Κροτωνιάτης. περὶ δὲ τὸν αὐτὸν χρό-
 νον τοῦτον ἡ τε φωνὴ μεταβάλλειν ἄρχεται ἐπὶ
 τὸ τραχύτερον¹¹ καὶ ἀνωμαλέστερον, οὗτ' ἔτι¹²

¹ ἀνθρώπων β ² om. β γ

³ πρότερον β Ald.

⁴ om. β γ (exc. L^c m n)

⁵ om. α γ Ald. Bk.

⁶ om. α γ Bk.

⁷ φέρειν τὸ σπέρμα β γ C^a Ald. Dt.: σπ. φ. α Bk.

⁸ ἀνθεῖν α γ edd. ⁹ om. γ C^a Bk. Dt.

¹⁰ Ἀлк. φησὶν γ C^a A^a G^a pr. Bk. Dt.

BOOK IX(VII)^a

With regard to man's development, both initially I
within the female and subsequently until old age,
the attributes due to his proper nature are as fol-
lows. We have previously^b spoken of the difference
between the male and the female, and of their parts.
The male first begins to produce seed, as a rule, on
the completion of twice seven^c years. At the same
time the growth of the pubic hair begins, just as
plants that are about to seed produce flowers first,
as Alcmaeon of Croton^d says. At about this same
time, firstly the voice begins to change, becoming
rougher and more uneven, no longer high-pitched

^a See note *a* on page 56.

^b The only discussion of general differences between the human male and female is the brief summary at VIII(IX) 608b8, but Aristotle probably refers here only to differences of parts reported at I 493a11 ff (here "the difference ... and ... their parts" may be hendiadys meaning "the difference *in* their parts").

^c Cf. V 544b26, VI 570a30, *Pol.* VII 1335b33, *Hipp. Hebd.* VIII 634 Littré, Censorinus *De die natali* 14.

^d An influential 5th-century medico-philosopher, often quoted by Arist., who wrote a book on him (not extant).

¹¹ βαρύτερον β (exc. V^ccorr.): *grauius* Guil.: *asperiozem* Gaza ¹² οὐτ' ἐτι γ: οὐ τέ τι α β L^c Ald.: οὐτε τῇ η

- ὀξεῖα οὖσα οὔτε πω βαρεῖα οὔτε πᾶσα ὁμαλὴ ἀλλ’
 20 ὁμοία φαινομένη¹ ταῖς παρανενευρισμέναις καὶ
 τραχεαῖς χορδαῖς· ὃ καλοῦσι τραγίζειν. γίνεται
 δὲ τοῦτο μᾶλλον τοῖς πειρωμένοις ἀφροδισιάζειν·
 τοῖς γὰρ περὶ ταῦτα προθυμουμένοις καὶ μεταβάλ-
 λουσιν αἱ φωναὶ εἰς τὴν τῶν ἀνδρῶν φωνήν, τοῖς
 δὲ ἀπεχομένοις² τούναντίον· ἐὰν δὲ καλ³ συναπο-
 25 βιάζωνται ταῖς ἐπιμελείαις, ὅπερ ποιοῦσιν ἔνιοι
 τῶν περὶ τὰς χορείας σπουδαζόντων, καὶ μέχρι
 πόρρω διαμένει καὶ τὸ πάμπαν μικρὰν λαμβάνει
 μεταβολήν. καὶ μαστῶν ἔπαρσις γίνεται καὶ
 αἰδοίων οὐ μεγέθει μόνον ἀλλὰ καὶ εἶδει. συμβαί-
 νει δὲ περὶ τοῦτον τὸν χρόνον τοῖς τε πειρωμένοις
 30 τρίβεσθαι περὶ τὴν τοῦ σπέρματος πρόεσιν οὐ
 μόνον ἡδονὴν γίνεσθαι τοῦ σπέρματος ἐξιόντος
 ἀλλὰ καὶ λύπην.

περὶ τὸν αὐτὸν δὲ χρόνον καὶ τοῖς θήλεσιν ἢ τ’
 ἔπαρσις γίνεται τῶν μαστῶν καὶ τὰ καταμήνια
 581b καλούμενα καταρρήγνυται· τοῦτο δ’ ἐστὶν αἷμα
 οἶον νεόσφακτον. τὰ δὲ λευκὰ καὶ παιδίους
 γίνεται νέοις οὔσι πάμπαν, μᾶλλον δ’ ἂν ὑγρὰ
 χρῶνται τροφῇ· καὶ κωλύει τὴν αὕξησιν⁴ καὶ τὰ
 5 σώματα ἰσχυαίνει τῶν παιδίων. τὰ δὲ κατα-

¹ om. β

² τοῖς δ’ ἀπεχ. β Ald. edd.: ἀπεχ. δὲ α γ Bk.

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but not yet deep, nor all of one pitch, but sounding like ill-strung and rough lyre strings: what they call 'goat-voice'. This development is greater in those who attempt sexual intercourse; for in those who indulge vigorously the voice even changes to that of a man, while in those who abstain the opposite is the case; and if they help to check it through exercises, as some do who are engaged in the choruses, the voice remains the same for a long time and the change that it undergoes is altogether slight. Secondly, there develops a swelling up of breasts and genitalia, not only in size but in form too. And at about this time, in connection with the emission of the seed, those who try friction experience not only pleasure as the seed is discharged but also pain.

At about the same time in the females too there develops the swelling up of the breasts, and the flow of the so-called menses is released: this is blood like that from freshly slaughtered animals. But the whites^a occur also in children while they are quite young, and excessively if their food is liquid: this even impedes their growth and emaciates children's bodies. The menses, however, first occur in most

^a See GA II 738a25 for Arist.'s theory of whites and menses; here by stressing the harmfulness he may be taking a different view, but more probably 581b3 means that growth is impeded *only* when the whites are excessive.

³ om. β: *et* Guil. ⁴ αἰξην γ (exc. n) Ald. Bk.

- μήνια γίνεται ταῖς πλείσταις ἤδη τῶν μαστῶν
ἐπὶ δύο δακτύλους ἡρμένων.¹ καὶ ἡ φωνὴ δὲ καὶ
ταῖς παισὶ μεταβάλλει περὶ τὸν χρόνον τοῦτον
ἐπὶ τὸ βαρύτερον. ὅλως μὲν γὰρ γυνὴ ἀνδρὸς
ὀξυφωνότερον, αἱ δὲ νέαι τῶν πρεσβυτέρων,
ὥσπερ καὶ οἱ παῖδες τῶν ἀνδρῶν· ἀλλ' ἔστιν
10 ὀξυτέρα² ἡ φωνὴ τῶν³ θηλειῶν παιδῶν ἢ τῶν
ἀρρένων, καὶ ὁ παρθένιος αὐλὸς τοῦ παιδικοῦ
ὀξύτερος. μάλιστα δὲ καὶ φυλακῆς δέονται περὶ
τὸν χρόνον τοῦτον· μάλιστα γὰρ ὁρμῶσι πρὸς
τὴν τῶν ἀφροδισίων χρῆσιν ἀρχομένων αὐτῶν,
ὥστε ἂν μὴ διευλαβηθῶσι μηθὲν ἐπὶ πλείον
15 κινεῖν⁴ ἢ ὅσον⁵ αὐτὰ τὰ σώματα μεταβάλλει
μηθὲν χρωμένων ἀφροδισίοις, ἀκολουθεῖν εἰωθεν
εἰς τὰς ὕστερον ἡλικίας. αἱ τε γὰρ νέαι πάνπαν
ἀφροδισιαζόμεναι ἀκολαστότεραι γίνονται, καὶ οἱ
ἄρρενες ἐάν τ' ἐπὶ θάτερα ἐάν τ' ἐπ' ἀμφοτέρα
ἀφυλακτῆσωσιν· οἱ τε γὰρ πόροι ἀναστομοῦνται
20 καὶ ποιοῦσιν εὖρουν τὸ σῶμα ταύτῃ· καὶ ἅμα ἡ
τότε μνήμη τῆς συμβαινούσης ἡδονῆς ἐπιθυμίαν

¹ ἡρμένων C^a Bk.

² ὀξυτέρα post φωνή transp. α γ Ald. Bk.

³ ἡ τῶν α Bk. Dt.

⁴ β γ Ald. Cs. Sn.: κινῆσαι C^a Bk. Dt.: κινεῖσθαι α

⁵ ἢ ὅσον β γ Ald. Cs. Sn.: οὐ C^a Bk. Dt.: ἕως οὐ α Canis.

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females after the breasts have risen to a height of two fingers. The voice too changes in girls about this time to the deeper. For while a woman's voice is on the whole higher pitched than a man's, young women's voices are higher than the older women's, just as the boys' voices are higher than the men's; but the female children's voice is higher than the males', and the "maiden's pipe" is higher than the "boy's".^a They^b are in most need of guarding too about this time; for their impulse towards sexual activities is strongest when they begin, so that if they do not take care to avoid causing further movement^c (beyond the changes that their bodies themselves make, even without sexual activity) it is likely to continue into their later life. For the females who are sexually active while quite young become more intemperate, and so do the males if they are unguarded either in one direction or in both. For the channels become dilated and make an easy passage for fluids in this part of the body; and at the same time their old memory of the accompanying pleasure creates desire for the intercourse

^a Athen. IV 79 (176F) mentions "maiden's", "boy's" and "man's" as names for different sizes of pipe or flute.

^b Children or only girls? At b17 both girls and boys are mentioned, so probably both are intended here.

^c Not only local motion but any change. The argument is: sexual activity causes further bodily changes, which may become permanent and lead to permanently excessive sexual activity. The bodily changes are explained at 581b19.

ποιεῖ τῆς τότε γινομένης ὁμιλίας.

γίνονται δέ τινες ἄνηβοι ἐκ γενετῆς καὶ ἄγονοι διὰ τὸ πηρωθῆναι περὶ τὸν τόπον τὸν γόνιμον· ὁμοίως δὲ καὶ γυναῖκες γίνονται ἄνηβοι ἐκ γενετῆς.

μεταβάλλουσι δὲ καὶ τὰς ἕξεις καὶ τὰ ἄρρενα
 25 καὶ τὰ θήλεα περὶ τε¹ τὸ ὑγιεινότερα εἶναι καὶ
 νοσερώτερα καὶ περὶ τὴν τοῦ σώματος ἰσχύτητα
 καὶ παχύτητα καὶ εὐτροφίαν· μετὰ γὰρ τὴν
 ἡβην οἱ μὲν ἐξ ἰσχνῶν παχύνονται καὶ ὑγιεινότε-
 ροι γίνονται, οἱ δὲ τοῦναντίον· ὁμοίως δὲ τοῦτο
 συμβαίνει καὶ ἐπὶ τῶν παρθένων. ὅσοι μὲν γὰρ
 30 παῖδες ἢ ὅσαι παρθένοι περιττώματα κατὰ² τὰ
 σώματα εἶχον, συναποκρινομένων τῶν τοιούτων
 τοῖς μὲν ἐν τῷ σπέρματι ταῖς δ' ἐν τοῖς καταμη-
 νίοις ὑγιεινότερα τὰ σώματα γίνεται καὶ εὐ-
 582a τραφέστερα, ἐξιόντων τῶν ἐμποδιζόντων τὴν
 ὑγίειαν καὶ τὴν τροφήν· ὅσοις³ δὲ τοῦναντίον,
 ἰσχνότερα καὶ νοσερώτερα τὰ σώματα γίνεται·
 ἀπὸ γὰρ τῆς φύσεως καὶ τῶν καλῶς ἐχόντων ἢ
 ἀπόκρισις γίνεται τοῖς μὲν ἐν τῷ σπέρματι ταῖς
 5 δ' ἐν τοῖς καταμηνίοις.

ἔτι δὲ ταῖς γε⁴ παρθένοις καὶ τὰ περὶ τοὺς
 μαστοὺς γίνεται διαφερόντως ἑτέραις πρὸς ἑτέ-

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that then took place.

Some men grow up congenitally impuberal and sterile because of malformation in the genital region; similarly there are women who grow up congenitally impuberal.

There is a change of condition too, in both males and females, in their proneness to health and sickness and in their bodily leanness and fatness and well-being. For after puberty some males put on weight from being thin, and grow healthier, but others do the opposite; and this happens in the same way in girls too. For in all boys or girls who had residues in their bodies, when these are discharged together with the seed or the menses respectively, their bodies become healthier and more thriving with the departure of that which was impeding their health and nutrition; but in the opposite cases their bodies become thinner and sicklier, for there the discharge in the seed or menses respectively comes from what is natural and in the right state.

Further, in the case of girls, the development of the breasts differs as between one girl and another:

¹ om. β K^c

² codd. Ald.: *superfluitatibus plena* Guil.: περιττωματικὰ coni. Sn. Bk. Dt.

³ ὄσσοι γ Ald. Bk.

⁴ γ Ald. Bk.: τε α : om. β Guil.

- ρας· αἱ μὲν γὰρ πάνπαν μεγάλους ἴσχουσιν, αἱ
 δὲ μικρούς. ὥς ἐπὶ τὸ πολὺ δὲ συμβαίνει τοῦτο,
 ὅσαι ἂν παῖδες οὔσαι περιττωματικά ὦσιν· μελ-
 10 λόντων γὰρ καὶ οὔπω γινομένων τῶν γυναι-
 κείων, ὅσῳ ἂν πλείων ὑγρότης ᾖ,¹ τοσούτω
 μᾶλλον ἀναγκάζει αἵρεσθαι ἄνω, ἕως ἂν καταρ-
 ραγῇ· ὥστε τότε² λαβόντες ὄγκον οἱ μαστοὶ δια-
 μένουσι καὶ εἰς τὸ ὕστερον. καὶ τῶν ἀρρένων δὲ
 ἐπιδηλότεροι γίνονται καὶ γυναικικώτεροι οἱ μασ-
 τοί,³ καὶ νεωτέροις καὶ πρεσβυτέροις οὔσι, τοῖς
 15 ὑγροῖς καὶ λείοις καὶ μὴ φλεβώδεσι, καὶ τούτων
 μᾶλλον τοῖς μέλασιν ἢ λευκοῖς.

- μέχρι μὲν οὖν τῶν τρεῖς⁴ ἑπτὰ ἐτῶν τὸ μὲν
 πρῶτον ἄγωνα τὰ σπέρματά ἐστιν· ἔπειτα γόνιμα
 μὲν μικρὰ δὲ καὶ ἀτελῇ γεννῶσι καὶ οἱ νέοι
 καὶ αἱ νέαι, ὥσπερ καὶ ἐπὶ τῶν ἄλλων ζώων τῶν
 20 πλείστων. συλλαμβάνουσι μὲν οὖν αἱ νέαι θᾶτ-
 τον· ἐὰν δὲ συλλάβωσιν, ἐν τοῖς τόκοις πονοῦσι
 μᾶλλον. καὶ τὰ σώματα δ' αὐτῶν ἀτελέστερα
 γίνεται ὥς ἐπὶ τὸ πολὺ καὶ γηράσκει θᾶττον τῶν
 τ' ἀφροδισιαστικῶν ἀρρένων καὶ τῶν γυναικῶν
 τῶν τοῖς τόκοις χρωμένων πλείοσιν· δοκεῖ γὰρ

¹ ὑγρότης ἢ β: ἢ ὑγρότης α γ: ἢ ὑγρότης F^a X^c: ὑγρότης E^a: ἢ
 ὑγρότης ἢ Ald. edd. ² τότε post ὄγκον transp. β

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in some they grow quite large, in others small. As a rule the former occurs in all who tend to residues in childhood; for when the menses are due but have not yet come, the more fluid there is the more it compels an upward flow, until the menses are released; and so the breasts acquire bulk at that time and remain the same in future. In the males too the breasts become more conspicuous and womanlike, both in youth and in age, in those whose constitution is liquid and smooth and without large blood vessels, especially those that are dark rather than fair.

Now up to thrice seven years the seeds are at first^a infertile, then they are fertile but the offspring of young men and young women are small and imperfect, as in most other animals too. Now the young females conceive quicker; but having conceived they have more trouble in childbearing. Also their bodies develop less completely as a rule, and age faster, both in men given to sexual activity and in women who give birth too many times; for it

^a The meaning seems to be that at first, after the appearance of seed at age 14, the seed is infertile, then it becomes fertile but weak, only reaching full strength at age 21 (cf. V 544b14, 27; *Pol.* VII 1335a11). On the implication that the female too produces seed, apparently contradicting *GA*, see X 634b29 note.

³ οἱ πολλοὶ om. β

⁴ δὲ β (exc. V^crec.) L^crec. Guil. Ald. Ar. epit. I. 71: *ter* v.l. *bis* Gaza

οὐδ' ἡ αὖξησις ἔτι γίνεσθαι μετὰ τοὺς τρεῖς
 25 τόκους. καθίστανται δὲ καὶ σωφρονίζονται
 μᾶλλον ὅσαι τῶν γυναικῶν ἀκόλαστοι πρὸς τὴν
 ὁμιλίαν εἰσὶ τὴν τῶν ἀφροδισίων, ὅταν¹ τόκοις
 χρήσωνται πολλοῖς. μετὰ δὲ τὰ τρεῖς ἑπτὰ ἔτη αἱ
 μὲν γυναικες πρὸς τὰς τεκνογονίας ἤδη εὐκαίρως
 ἔχουσιν, οἱ δ' ἄνδρες ἔτι ἔχουσιν ἐπίδοσιν.

30 ἔστι δὲ τὰ μὲν λεπτὰ τῶν σπερμάτων ἄγωνα,
 τὰ δὲ χαλαζώδη γόνιμα καὶ ἄρρενογόνα μᾶλλον·
 τὰ δὲ λεπτὰ καὶ μὴ θρομβώδη θηλυγόνα.

καὶ τοῦ γενείου δὲ τρίχους συμβαίνει τοῖς
 ἄρρεσι περὶ τὴν ἡλικίαν ταύτην.

II ἡ δὲ τῶν γυναικείων ὁρμὴ γίνεται περὶ φθί-
 35 νοντας τοὺς μῆνας· διὸ φασὶ τινες τῶν σοφίζο-
 582b μένων καὶ τὴν σελήνην εἶναι θῆλυ, ὅτι ἅμα συμ-
 βαίνει ταῖς μὲν ἢ κάθαρσις τῇ δ' ἢ φθίσις, καὶ
 μετὰ τὴν κάθαρσιν καὶ τὴν φθίσιν ἢ πλήρωσις
 ἀμφοῖν. καὶ ταῖς μὲν συνεχῶς καθ' ἕκαστον ὀλι-
 γάκις τὰ καταμήνια φοιτᾷ, παρὰ μῆνα δὲ²
 5 τρίτον ταῖς πλείσταις. ὅσαις μὲν οὖν ὀλίγον
 χρόνον γίνεται, δύο ἢ τρεῖς ἡμέρας, ἀπαλλάτ-
 τουσι ῥᾶον, ὅσαις δὲ πολλάς, χαλεπώτερον.

¹ ὅταν τοῖς α γ Ald. edd.

² δὲ post παρὰ transp. α (exc. C^a) edd.

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seems that no further growth takes place after the third childbirth. But women who are intemperate towards sexual intercourse tend to become settled and restrained after a number of births. After thrice seven years the women have reached a favourable state for childbearing, while the men continue to improve.

It is the thin seed that is infertile, while the granular is fertile and tends to generate males; that which is thin and not clotted generates females.

Further, the beard develops in the males at about this time of life.^a

The onset of the menses develops during the wane of the month^b; hence the sophistic riddle—the moon too is female because the women's menstruation and the moon's waning occur together, and after the menstruation and the waning both are made full. In some women the menses come regularly each month for a few days, but in the majority every third^c month. Those in whom it takes place for a short time, two or three days, come off more lightly, while those in whom it lasts many days have

II

^a The third seven-year period, from 14 to 21.

^b The wane of the month is the last eight days before the new moon at which each month theoretically began. In the following discussion months are always real lunar months.

^c Counting inclusively. The statement means that in most cases the interval between menses exceeds four weeks.

πονοῦσι γὰρ τὰς ἡμέρας ταύτας· ταῖς μὲν γὰρ
 ἀθρόα ἢ κάθαρσις γίνεται¹ ταῖς δὲ κατ' ὀλίγον,
 τὸ δὲ σῶμα βαρύνεται πάσαις ἕως ἂν ἐξέλθῃ.

- 10 πολλαῖς δὲ καὶ ὅταν ὀρμῇ τὰ καταμήνια καὶ
 μέλλῃ ῥήγνυσθαι,² πνιγμοὶ γίνονται καὶ ψόφος
 ἐν ταῖς ὑστέραις ἕως ἂν ῥαγῇ.

- φύσει μὲν οὖν ἡ σύλληψις γίνεται μετὰ τὴν
 τούτων ἀπαλλαγὴν ταῖς γυναιξίν· καὶ ὅσαις μὴ
 γίνεται ταῦτα, ὥς ἐπὶ τὸ πολὺ ἄτεκνοι διατελοῦ-
 σιν. οὐ μὴν ἀλλὰ καὶ μὴ γινομένων τούτων
 15 ἔνιαι συλλαμβάνουσιν, ὅσαις συναθροίζεται ἱκμὰς
 τοσαύτη ὅση ταῖς γειναμέναις ὑπολείπεται μετὰ
 τὴν κάθαρσιν, ἀλλὰ μὴ ὥστε καὶ θύραζε ἐξιέναι.³
 καὶ γινομένων ἔτι ἔνιαι συλλαμβάνουσιν· ὅστε-
 ρον δ' οὐ συλλαμβάνουσιν, ὅσαις εὐθὺς μετὰ τὴν
 κάθαρσιν αἱ ὑστέραι συμμύουσιν. γίνεται δ' ἐνίαις
 20 καὶ κυούσαις διὰ τέλους τὰ γυναικεῖα· συμβαίνει
 μέντοι ταύταις⁴ φαῦλα τίκτειν, καὶ ἢ μὴ σώζε-
 σθαι εἰς αὖξιν ἢ ἀσθενῇ τὰ ἔκγονα γίγνεσθαι.
 πολλαῖς δὲ καὶ διὰ τὸ δεῖσθαι τῆς συνουσίας ἢ
 διὰ τὴν νεότητα καὶ τὴν ἡλικίαν, ἢ διὰ τὸ

¹ γίνεται ante ἢ καθ. transp. β

² γίγνεσθαι β

³ ἐξιόντων β L^crec.

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more trouble. For they suffer during these days; for though in some the purgation takes place all together, and in others little by little, in all of them the body feels burdened until it has been discharged. Many women also, when the menses are setting in and are about to break into flow, experience choking feelings and noise in the uterus until the flow breaks out.

Now by nature conception takes place in women after this discharge is completed; and those that do not have the discharge remain childless as a rule. Nevertheless some conceive even without its occurrence, namely those that have as much fluid^a collected within as remains after the purgation in childbearing women, though not enough to emerge outside the body. And some conceive while it is still taking place; but conception does not occur later than that, in those whose uterus closes up immediately after the purgation. In some women the menses continue throughout pregnancy; however, the result is that they have inferior offspring, and their young either do not survive to grow or grow up weak. Again, in many women because of their need for intercourse, due either to their youth and time of

^a "Fluid": the menstrual blood, which is the proximate matter out of which the foetus is formed by movements imported by the male seed (GA I 727b12-27, 729a9 ff).

⁴ αἰματὶς β γ Ald.

χρόνον ἀπέχεσθαι πολύν, καταβαίνουσιν αἱ
 25 ὑστέραι κάτω καὶ τὰ γυναικεῖα γίνεται πολλάκις
 τρίς τοῦ μηνὸς ἕως ἂν συλλάβωσιν· τότε δ'
 ἀπέρχονται πάλιν εἰς τὸν ἄνω τόπον τὸν οἰκεῖον.
 ἐνίοτε δὲ καὶ ἐὰν μὴ συμβῇ¹ ἔχουσα, τύχη δ'
 ὑγρὰ οὔσα, ἀποφυσᾷ τοῦ σπέρματος τὸ ὑγρό-
 τερον.

πάντων δὲ τῶν ζώων, ὥσπερ εἴρηται καὶ πρό-
 τερον, ταῖς γυναιξὶ μᾶλλον τῶν ἄλλων θηλειῶν
 30 ἢ κάθαρσις γίνεται πλείστη. τοῖς μὲν γὰρ μὴ
 ζωοτοκοῦσιν οὐθὲν τοιοῦτον ἐπισημαίνει² διὰ τὸ
 τὴν περίττωσιν ταύτην τρέπεσθαι εἰς τὸ σῶμα
 (μείζω τε γὰρ ἔνια τῶν ἀρρένων ἐστί, καὶ ἔτι
 τοῖς μὲν εἰς φολίδας τοῖς δ' εἰς λεπίδας τοῖς δ'
 εἰς τὸ τῶν πτερῶν ἀναλίσκεται πλῆθος), τοῖς δὲ
 35 πεζοῖς καὶ ζωοτόκοις εἷς τε τὰς τρίχας καὶ τὸ
 583a σῶμα (λεῖον γὰρ ἄνθρωπός ἐστι μόνον) καὶ εἰς
 τὰ οὖρα (παχεῖαν γὰρ τὰ πλείστα καὶ πολλὴν τὰ
 τοιαῦτα ποιεῖται τὴν ἑκκρίσιν)· ταῖς δὲ γυναιξὶν
 ἀντὶ τούτων τρέπεται τὸ περίττωμα εἰς τὴν

¹ καὶ ἐὰν μὴ συμβῇ β L^{rec}. Ald.: καὶ συμ. α L^{pr}. Guil.
 Bk.: καὶ συμ. E^a P K^c M^c n: καὶ ἂν τᾶλλα μὲν εὖ ἔχουσα ὑστέρα
 τυγχάνῃ m^{rec}. in lac.: *etsi aliquando accidat* Guil.: *etsi*
cetera bene se habet uterus Gaza

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life or to long abstinence, the uterus comes down and the menses often occur thrice monthly until they have conceived; and then the uterus returns to its proper place above. But sometimes, even if it does not^a actually contain anything, but happens to be wet, it blows away the wetter part of the seed.

Of all animals, as we have said before, women above other females have the most menstrual discharge.^b For in the non-viviparous there is no such sign, because this residue is diverted to the body (for some are larger than the males, and in addition the residue is expended in some upon horny scales, in others upon fish-scales, and in others upon the mass of feathers), while in the footed and viviparous it is diverted to the hair and the body (for man is the only smooth one) and to the urine (for in most such animals the secretion is thick and abundant); but in women the residue is diverted instead to the purga-

^a That is, even if the menstrual discharge has ceased, excessive moisture may expel the seed (cf. GA I 727b24); for the seed, which is itself wet, becomes too fluid to adhere and is "blown away" by the internal wind which is naturally present in the uterus (cf. X 635b4); the uterus should be dry enough to hold the seed (X 638a20).

^b A frequent remark; e.g. III 521a26, VI 572b30, GA I 728b14. In menstrual discharge Arist. includes other internal secretions in viviparous quadrupeds and also the slight external discharge that occurs when they are in season.

² ἐπισυμβάλλει β L^c Ald.

κάθαρσιν. ὁμοίως δὲ ἔχει τοῦτο¹ καὶ ἐπὶ τῶν
 5 ἄρρένων· πλείστον γὰρ ὥς κατὰ τὸ μέγεθος
 ἀφίησι σπέρμα τῶν ἄλλων ζώων ἄνθρωπος (διὸ
 καὶ λειότατον τῶν ζώων ἐστὶν ἄνθρωπος), καὶ
 αὐτῶν δ' οἱ ὑγρότεροι τὰς φύσεις καὶ μὴ πολύ-
 σαρκοι λίαν, καὶ οἱ λευκότεροι δὲ τῶν μελάνων.
 καὶ ἐπὶ γυναικῶν δὲ τὸν αὐτὸν τρόπον· ταῖς γὰρ
 10 εὐσάρκοις πορεύεται εἰς τὴν τροφήν τοῦ σώματος
 τὸ πολὺ τῆς ἐκκρίσεως. καὶ ἐν ταῖς ὁμιλίαις δὲ
 τῶν ἀφροδισίων αἱ λευκότεραι τὴν φύσιν ἐξικμά-
 ζουσι μᾶλλον τῶν μελαινῶν. ποιεῖ δὲ τῆς
 τροφῆς τὰ ὑγρά καὶ δριμέα τοιαύτην τὴν ὁμιλίαν
 μᾶλλον.

III γίνεται δὲ σημεῖον τοῦ συνειληφέναι ταῖς
 15 γυναιξὶν ὅταν εὐθύς γένηται μετὰ τὴν ὁμιλίαν ὁ
 τόπος ξηρός. ἂν μὲν οὖν λεία τὰ χεῖλη ἢ τοῦ
 στόματος, οὐ θέλει συλλαμβάνειν (ἀπολισθαίνει
 γάρ), οὐδ' ἂν παχέα· ἂν δ' ἀπτομένῳ τῷ
 δακτύλῳ τραχύτερα ἢ καὶ ἀντέχεται, καὶ ἂν
 λεπτὰ τὰ χεῖλη, τότε εὐκαίρως ἔχει πρὸς τὴν
 20 σύλληψιν. πρὸς μὲν οὖν τὸ συλλαμβάνειν τοιαύ-
 τας δεῖ κατασκευάζειν τὰς ὑστέρας, πρὸς δὲ τὸ
 μὴ συλλαμβάνειν τοῦναντίον· ἂν γὰρ ἢ λεία τὰ
 χεῖλη, οὐ συλλαμβάνει· διὸ ἔνιοι² τῆς μήτρας

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tion. The case is similar in the males too: for compared with the other animals man discharges most seed in proportion to his size (which is why man is the smoothest of the animals), especially men whose natural constitution is wetter and not too fleshy, and those that are fair rather than dark. And similarly in women: in the well-fleshed most of the secretion goes to nourish the body. Also, in sexual intercourse women who are naturally fairer discharge more moisture than the dark. And the wet and bitter foodstuffs tend to have this effect upon intercourse.

Women obtain evidence of conception when the place has become dry immediately after intercourse. III
Now if the lips of the opening are smooth, they resist conception (for the seed slips out), and also if they are thick; but if the lips are rather rough to the touch of a finger, and clinging, and if they are thin, then the condition is opportune for conception. To bring about conception, then, this is the condition to which one should bring the uterus, and to avoid conception one should do the opposite. For if the lips are smooth, conception does not occur; this is why

¹ *τοῦτοις β L^crec. Guil.*

² *ἐνταῦθα A^arec. F^a X^c V^crec. γ (exc. L^crec.) Ald. Gaza Bk.*

πρὸς ὃ πίπτει τὸ σπέρμα ἀλείφουσιν ἐλαίῳ
 κεδρίῳ ἢ ψιμυθίῳ ἢ λιβανωτῷ, διέντες ἐλαίῳ.
 25 ἔαν δὲ ἐπτά ἐμμείνη ἡμέρας, φανερόν ὅτι
 εἴληπται· αἱ γὰρ καλούμεναι ἐκρύσεις ἐν ταύταις
 γίνονται ταῖς ἡμέραις.

αἱ δὲ καθάρσεις φοιτῶσι ταῖς πλείσταις ἐπὶ
 τινα χρόνον συνειληφύαις, ἐπὶ μὲν τῶν θηλειῶν
 τριάκονθ' ἡμέρας μάλιστα, περὶ τετταράκοντα
 δέ¹ ἐπὶ τῶν ἀρρένων. καὶ μετὰ τοὺς τόκους δ'
 30 αἱ καθάρσεις βούλονται τὸν αὐτὸν ἀριθμὸν ἀποδι-
 δόναι τούτων,² οὐ μὴν ἐξακριβοῦσί γε πάσαις
 ὁμοίως. μετὰ δὲ τὴν σύλληψιν καὶ τὰς ἡμέρας
 τὰς εἰρημένας οὐκέτι κατὰ φύσιν, ἀλλ' εἰς τοὺς
 μαστοὺς τρέπεται καὶ γίνεται γάλα. ἐπισημαί-

¹ δὲ τεττ. transp. α (exc. C^a) Bk.

² codd. (exc. τούτω T^c) Ald.: *hoc numero* Guil.: om. Gaza:
 τοῦτον coni. Sn. Bk. Dt.

^a μήτρα is a more popular term than ὑστέρα, and may refer to any part of the uterus and cervix. At III 510b11 it is distinguished from ὑστέρα and refers only to the os uteri and cervix, whereas at IX(VII) 586a28 and 586b11 it is the interior womb and at VIII(IX) 632a25 μήτραι are synonymous with ὑστέραι as the two "horns". With the text

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some people oil that part of the womb^a on to which the seed falls with cedar oil or cosmetic white or frankincense, dissolved in olive oil.^b If it stays in for seven days, it is clear that it has been held; for what are called effluxes^c take place within these days.

The menses come to most women for a certain time after conception, up to about thirty days in the case of female embryos and about forty in the case of males.^d And after the birth too the menses tend to observe^e the same intervals for them, though not indeed with the same accuracy in all women. But after conception and the number of days just mentioned it is natural for them to occur no longer but to be diverted to the breasts and form milk. The first

and translation printed here, τῆς μήτρας means "cervix"; however, the ay reading πρὸ τῆς μήτρας ("in front of the womb, where the seed falls") may be right. Cf. 634b27 note.

^b Gaza and edd. interpret this as a means of facilitating conception; a similar lotion is reported by Aetius 13 (quoted by Sn.). Hipp. *steril.* 243 (VIII 456 L) recommends a mixture of powdered lead and magnetic stone in milk, to promote adhesiveness. The lotion described here, however, would be oily, and the context makes it possible to interpret it as a contraceptive device, perhaps misunderstood by Aetius.

^c Cf. 583b11.

^d Hipp. *nat. puer.* 18 (VII 500 L) says 42 days for females, 30 for males.

^e Lit. "render" or "repay", i.e. delay until 30 days after birth in the case of female embryos, 40 days in the case of males. τούτων is possessive genitive with ἀριθμόν, and refers to the embryos.

νει δὲ τὸ πρῶτον μικρόν τε καὶ ἀραχνιώδες τὸ γάλα ἐν τοῖς μαστοῖς.

35 ὅταν δὲ συλλάβωσιν, αἰσθησις μάλιστα ἐγγίνε-
583b ται¹ ἐν τε ταῖς λαγόσιν (ἐνίαις γὰρ γίνονται
πληρέστεραι εὐθύς· μᾶλλον δ' ἐπιδήλως τοῦτο
συμβαίνει ταῖς ἰσχναῖς) καὶ ἐν² τοῖς βουβῶσιν.

ἐπὶ μὲν οὖν³ τῶν ἀρρένων ὥς ἐπὶ τὸ πολὺ ἐν
τῷ δεξιῷ μᾶλλον περὶ τὰς τετταράκοντα γίνεται
5 ἡ κίνησις, τῶν δὲ θηλειῶν ἐν τῷ ἀριστερῷ περὶ
ἐνενήκονθ' ἡμέρας. οὐ μὴν ἀλλ' ἀκρίβειάν γε
τούτων οὐδεμίαν ὑποληπτέον· πολλαῖς γὰρ
θηλυτοκούσαις ἡ κίνησις ἐν τῷ δεξιῷ γίνεται, καὶ
ταῖς ἐν τῷ ἀριστερῷ ἄρρεν· ἀλλὰ καὶ⁴ ταῦτα καὶ
τὰ τοιαῦτα πάντα διαφέρει ὥς ἐπὶ τὸ πολὺ καὶ
τῷ μᾶλλον καὶ ἥττον.⁵

10 περὶ δὲ τοῦτον τὸν χρόνον καὶ σχίζεται τὸ
κύημα· τὸν δ' ἔμπροσθεν ἀναρθρον συνέστηκε
κρεῶδες. καλοῦνται δ' ἐκρύσεις μὲν αἱ μέχρι τῶν
ἑπτὰ ἡμερῶν διαφθοραί, ἐκτρωσμοὶ δ' αἱ μέχρι
τῶν τετταράκοντα· καὶ πλεῖστα διαφθείρεται τῶν
κυημάτων ἐν ταύταις ταῖς ἡμέραις. τὸ μὲν οὖν

¹ γίνεται β ² ἐπὶ β γ Ald.

³ om. α γ Ald. Bk.

⁴ om. β L^c Ald.

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sign of milk in the breasts is in small quantity and cobwebby.

After conceiving, a feeling develops chiefly in the flanks (which immediately become fuller in some women; this happens more conspicuously in thin women) and in the groin.

Now in the case of males, their movement tends to take place as a rule on the right side at about forty days, that of females on the left at about ninety days.^a Nevertheless there is of course no accuracy to be assumed in these things; for in many who bear females the movement occurs on the right, while those who feel it on the left bear a male; but these and all such things usually differ also by the more-and-less.

At about this time too the foetus is divided up: previously it has been an unarticulated fleshy construction. Effluxes is the name for abortions up to seven days, miscarriages for those up to forty days^b; most abortions occur within these days. Now when

^a A traditional belief (Parmenides D-K 28 A 53, 54; Anaxagoras D-K 59 A 42.12; Hippocrates *Aph.* V 48, IV 550 L). Here Aristotle discounts it, and in *GA* IV 1 argues against it theoretically (764a33, 765a16 ff). The dates of first movement are given by *Hipp. nat. p.* 21 (VII 510 L) as 3 months for males, 4 months for females.

^b *Hipp. sept. p.* 9 (VII 446 L) makes the same distinction.

⁵ τὸ μ. καὶ τὸ ῥ. β L^c m n Ald.: τὸ μ. καὶ ῥ. E^a P M^c: τὸ μ. ῥ. K^c

- 15 ἄρρεν ὅταν ἐξέλθῃ τετταρακοσταῖον, ἐὰν μὲν εἰς
 ἄλλο τι ἀφῇ τις, διαχεῖται τε καὶ ἀφανίζεται, ἐὰν
 δ' εἰς ψυχρὸν ὕδωρ, συνίσταται οἶον ἐν ὑμένι·
 τούτου δὲ διακνισθέντος φαίνεται τὸ ἔμβρυον τὸ
 μέγεθος ἡλίκον μύρμηξ τῶν μεγάλων, τά τε μέρη¹
 δῆλα τά τε ἄλλα πάντα καὶ τὸ αἰδοῖον καὶ οἱ
 20 ὀφθαλμοὶ καθάπερ ἐπὶ τῶν ἄλλων ζώων μέγιστοι.
 τὸ δὲ θῆλυ, ὃ τι μὲν ἂν διαφθαρῇ ἐντὸς τῶν τριῶν²
 μηνῶν, ἀδιάρθρωτον ὥς ἐπὶ τὸ πολὺ φαίνεται· ὃ
 τι³ δ' ἂν ἐπιλάβῃ τοῦ τετάρτου μηνός, γίνεται
 ἐσχισμένον καὶ διὰ ταχέων λαμβάνει τὴν ἄλλην
 διάρθρωσιν. ἕως⁴ μὲν οὖν πᾶσαν τὴν τελείωσιν
 25 τῶν μορίων βραδύτερον ἀπολαμβάνει τὸ θῆλυ τοῦ
 ἄρρενος, καὶ δεκάμηνα γίνεται μᾶλλον τῶν ἀρρέ-
 νων· ὅταν δὲ γένηται, θᾶττον τὰ θήλεα τῶν ἀρρέ-
 νων καὶ νεότητα καὶ ἀκμὴν λαμβάνει καὶ γήρας,
 καὶ μᾶλλον αἱ πλείοσι χρώμεναι⁵ τόκοις, ὥσπερ
 εἴρηται πρότερον.
- IV ὅταν δὲ συλλάβῃ ἢ ὑστέρα τὸ σπέρμα, εὐθὺς
 30 συμμύει ταῖς πολλαῖς μέχρι γένωνται ἑπτὰ
 μῆνες· τῷ δ' ὀγδόῳ χάσκουσιν· καὶ τὸ ἔμβρυον,

¹ β L^crec. Ald.: μέλη α γ Guil. Gaza edd.

² om. β (add. O^crec. V^crec.)

³ ὃ τι] ὅτε β E^a n

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the male comes away at forty days, although if put into anything else it dissolves and disappears, if put into cold water it sets as if in a membrane; and if this is teased apart, the embryo appears the size of one of the big ants, with all its parts evident, especially the genitalia, and the eyes very big just as in the other animals. But any female that is aborted within the three months appears unarticulated as a rule; any that has reached the fourth month has become divided and achieves the rest of the articulation in quick stages. For a time, then, the female is slower than the male to attain the complete formation of its parts, and tends more than the males to be born at ten months. But once born, the females are quicker than the males to reach youth and maturity and old age, especially those that give birth more times, as we have said before.^a

After the uterus has conceived the seed,^b it closes IV
up immediately in most women until seven months have passed; in the eighth it opens out; and the

^a 582a23.

^b This is the full and correct expression: συλλαμβάνειν means to grasp, and when it refers to the womb conceiving, its object (not necessarily expressed) is the male seed, not as in English "a child".

⁴ α γ: τέως F^a X^c m Camot. Sylb. Sn. Bk.: ἐνῶ β (ἐν ὧ V^crec.): πᾶσαν μ. ο. (om. ζως) L^cpr. Ald. Cs.: tandem igitur Guil.: nam usque ad Trap.: cum itaque Gaza

⁵ χρ. πλ. transp. β γ Ald.

ἐὰν ᾗ γόνιμον, προκαταβαίνει τῷ ὀγδόῳ μηνί. τὰ
 δὲ μὴ γόνιμα ἀλλ' ἀποπεπνιγμένα ὀκτάμηνα ἐν
 τοῖς τόκοις οὐκ ἐκφέρουσιν ὀκτάμηνα αἱ γυναῖκες,
 οὔτε προκαταβαίνει κάτω τὰ ἔμβρυα τῷ ὀγδόῳ
 35 μηνί, οὔτε αἱ ὑστέραι¹ ἐν τῷ χρόνῳ τούτῳ
 584a χάσκουσιν· ἀλλὰ σημεῖον ὅτι οὐ γόνιμον ἐὰν γένη-
 ται μὴ συμπεσόντων τῶν εἰρημένων.

μετὰ δὲ τὰς συλλήψεις αἱ γυναῖκες βαρύνον-
 ται τὸ σῶμα πᾶν, καὶ σκότοι πρὸ τῶν ὀμμάτων
 καὶ ἐν τῇ κεφαλῇ γίνονται πόνοι. ταῦτα δὲ ταῖς
 5 μὲν θάπτον καὶ σχεδὸν δεκαταίαις γίνεται, ταῖς
 δὲ βραδύτερον, ὅπως ἂν τύχωσιν οὔσαι τῷ περι-
 τωματικαὶ εἶναι μᾶλλον καὶ ἥττον. ἔτι δὲ
 ναυτίαι καὶ ἔμετοι λαμβάνουσι τὰς πλείστας, καὶ
 μάλιστα τὰς τοιαύτας, ὅταν αἱ τε καθάρσεις
 στῶσι καὶ μήπω εἰς τοὺς μαστοὺς τετραμμένοι
 10 ὦσιν. ἔναι μὲν οὖν ἀρχόμεναι μᾶλλον πονοῦσι
 τῶν γυναικῶν ἔναι δ' ὕστερον ἤδη τοῦ κυήματος
 ἔχοντος αὔξησιν μᾶλλον· πολλαῖς δὲ καὶ πολλά-
 κισ καὶ στραγγουρίαι γίνονται τὸ τελευταῖον. ὥς
 μὲν οὖν ἐπὶ τὸ πολὺ ῥᾶον ἀπαλλάττουσιν αἱ τὰ
 ἄρρενα κύουσai καὶ μᾶλλον μετ' εὐχροίας διατε-
 λοῦσιν, ἐπὶ δὲ τῶν θηλειῶν τὸναναντίον· ἀχρού-
 15 στεραι γὰρ² ὥς ἐπὶ τὸ πολὺ καὶ βαρύτερον

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embryo, if fertile, advances downward in the eighth month. Those that are not fertile but have been suffocated at eight months are not delivered in eight-month births, nor do the embryos advance downward in the eighth month, nor does the uterus open out during this time; but it is a sign that it is not fertile, if it has been formed without the accompanying circumstances just mentioned.

After conception women feel weighed down over their whole body, and experience darkness in front of the eyes and pains in the head. Some develop these feelings sooner, even at about ten days, others more slowly, according to whether they tend more or less to form residues. Further, nausea and vomiting seize most women, especially women of that nature,^a when the menses have ceased flowing and have not yet been diverted to the breasts. Now some women suffer more at the beginning, some later when the foetus has put on more growth; many also experience frequent stranguries towards the end. Now as a rule those that bear males have an easier time in pregnancy and tend to keep a good colour,^b while in the case of females it is the opposite: they have less colour as a rule, they feel more oppressed,

^a That is, tending to form residues.

^b Cf. Hipp. *aph.* V 42 (IV 546 L), *steril.* 216 (VIII 416 L).

¹ codd. Ald.: ὅσπεραι Bk.

² ante γὰρ add. τὸ α γ (del. L^{rec.}): add. τε Bk. Dt. Louis

διάγουσι, καὶ πολλαῖς περὶ τὰ σκέλη οἰδήματα
καὶ ἐπάρσεις γίνονται τῆς σαρκός· οὐ μὴν ἄλλ'
ἐνίαις γίνεται καὶ τὰναντία τούτων.

εἰώθασι δὲ ταῖς κυούσαις ἐπιθυμίαι¹ γίνεσθαι
παντοδαπαὶ καὶ μεταβάλλειν ὁξέως, ὃ καλοῦσί
20 τινες κισσᾶν· καὶ ἐπὶ τῶν θηλειῶν ὁξύτεραι μὲν
αἱ ἐπιθυμίαι, παραγινομένων δὲ ἥττον δύνανται
ἀπολαύειν. ὀλίγαις δέ τισι συμβαίνει βέλτιον
ἔχειν τὸ σῶμα κυούσαις. μάλιστα δὲ ἀσῶνται
ὅταν ἄρχωνται τὰ παιδία τρίχας ποιεῖν.² αἱ δὲ
τρίχες ταῖς μὲν κυούσαις αἱ μὲν συγγενεῖς γίνον-
25 ται ἐλάττους καὶ ἐκρέουσιν,³ ἐν οἷς δὲ μὴ εἰώθα-
σιν ἔχειν τρίχας, ταῦτα δασύνεται μᾶλλον.

καὶ κίνησιν δὲ παρέχεται ἐν τῷ σώματι
μᾶλλον ὥς ἐπὶ τὸ πολὺ τὸ ἄρρεν τοῦ θήλεος, καὶ
τίκτεται θᾶττον, τὰ δὲ θήλεα βραδύτερον. καὶ ὁ
πόνος ἐπὶ μὲν τοῖς θήλεσι συνεχῆς καὶ νωθρότε-
30 ρος, ἐπὶ δὲ τοῖς ἄρρεσιν ὁξύς μὲν, πολλῶ δὲ
χαλεπώτερος. αἱ δὲ πλησιάζουσιν πρὸ τῶν
τόκων τοῖς ἀνδράσι θᾶττον τίκτουςιν. δοκοῦσι δ'
ὠδίνειν αἱ γυναῖκες ἐνίοτε οὐ γινομένης ὠδίνος,
ἀλλὰ διὰ τὸ τὴν κεφαλὴν στρέφειν τὸ ἔμβρυον
φαίνεται ὠδίνος ἀρχὴ τοῦτο γίνεσθαι.

τὰ μὲν οὖν ἄλλα ζῶα μοναχῶς ποιεῖται τὴν

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and many develop swellings about the legs and eruptions of the flesh; nevertheless in some women it is the opposite way about.

It is usual for pregnant women to develop all kinds of desires and to change them sharply — what some call jay-sickness. In the case of female embryos, the desires are sharper but they are less able to enjoy them when achieved. In a few individuals pregnancy is accompanied by better health. The nausea is worst when the babies begin to form hair. And the hair on pregnant women diminishes and falls out where it is congenital, but tends to grow thick where they do not usually have any.

Further, the male as a rule shows more movement than the female, and is born quicker, females more slowly. And labour in the case of females is continuous and more sluggish, while with males it is acute and much more difficult. Women who have intercourse with their husbands before the birth have a quicker delivery. Sometimes women seem to be in labour not because labour has begun but because the embryo turns its head and this appears to be the beginning of labour.

Now the other animals bring birth to completion

¹ αἱ ἐπιθ. α γ Ald. Bk.

² φέω β Dt.

³ φέουσιν α γ Bk. Dt.

- 35 τοῦ τόκου τελείωσιν· εἰς γὰρ ὥρισται τοῦ τόκου
 χρόνος πᾶσιν· ἀνθρώπῳ δὲ πολλοὶ μόνῳ τῶν
 ζώων· καὶ γὰρ ἐπτάμηνα καὶ ὀκτάμηνα καὶ
 ἐννεάμηνα γίνεται, καὶ δεκάμηνα τὸ πλεῖστον·
 584b ἔνιαι δ' ἐπιλαμβάνουσι καὶ τοῦ ἐνδεκάτου μηνός.
 ὅσα μὲν οὖν γίνεται¹ πρότερον² τῶν ἐπτὰ μηνῶν,
 οὐδὲν οὐδαμῇ δύναται ζῆν· τὰ δ' ἐπτάμηνα
 γόνιμα γίνεται πρῶτον, ἀσθενῇ δὲ τὰ πολλά (διὸ
 καὶ σπαργάνουσιν ἐρίοις αὐτά), πολλὰ δὲ καὶ τῶν
 5 πόρων ἐνίους ἔχοντα ἀσχίστους, οἷον ὤτων καὶ
 μυκτήρων· ἀλλ' ἐπαυξανομένοις διαρθροῦται, καὶ
 βιοῦσι πολλὰ καὶ τῶν τοιούτων. τὰ δ' ὀκτάμηνα
 περὶ μὲν Αἴγυπτον καὶ ἐν ἐνίοις τόποις, ὅπου
 εὐέκφοροι αἱ γυναῖκες καὶ φέρουσί τε πολλὰ
 ῥαδίως καὶ τίκτουσι, καὶ γενόμενα δύναται ζῆν
 10 κἂν τερατώδη γένηται, ἐνταῦθα μὲν ζῇ τὰ ὀκτά-
 μηνα καὶ ἐκτρέφεται, ἐν δὲ τοῖς περὶ τὴν Ἑλλάδα
 τόποις ὀλίγα πάνπαν σώζεται, τὰ δὲ πολλὰ
 ἀπόλλυται· καὶ διὰ τὴν ὑπόληψιν κἂν σωθῇ τι
 νομίζουσιν οὐκ ὀκτάμηνον εἶναι τὸ γεγεννημένον,
 ἀλλὰ λαθεῖν ἑαυτὰς αἱ γυναῖκες συμβάλλουσαι
 πρότερον.

¹ προτ. γιν. transp. β

² πρότερα K^crec. L^c m n Ald. Bk.

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in a single way, for there is one time fixed for the birth in all cases; but for man alone among animals there are many times: there are seven-month, eight-month, nine-month births, and the majority at ten months^a; some women even reach the eleventh month. Now those that are born earlier than the seven months can in no case live. The seven-month ones become fertile for the first time, but most are weak (hence they swaddle them in wool), and many have some of the passages undivided such as those of ears and nostrils; but as they put on growth these become articulated, and many such babies live. As for the eight-month ones, around Egypt and in certain places where the women are good at bringing to birth, and bear and deliver many with ease, and where once born they can live even if they are born deformed, there the eight-month ones live and are reared,^b whereas in the places around Greece few survive in all, and the majority perish; and because of this assumption, even if one survives the women think the child is not an eight-month one but that they made a mistake when calculating previously.

^a Lunar months. The Hippocratic reckoning was that the normal 10-month child is born after 7×40 days (*sept. p. 7, VII 446; oct. p. 10, 13, VII 452, 458 L*).

^b Aristotle opposes the Hippocratic belief that all 8-month babies die while some 7-month babies live (*Hipp. VII 438, 452, VIII 612 L*).

15 πονοῦσι δ' αἱ γυναῖκες¹ μάλιστα τὸν μῆνα τὸν
 τέταρτον καὶ τὸν ὀγδοον, καὶ ἐὰν διαφθείρωσι
 τετάρτῳ ἢ ὀγδῶ μηνὶ διαφθείρονται καὶ αὗται²
 ὥς ἐπὶ τὸ πολὺ, ὥστ' οὐ μόνον τὰ ὀκτάμηνα οὐ
 ζῇ ἀλλὰ καὶ διαφθειρομένων αἱ τίκτουςαι κιν-
 δυνεύουσιν.

 τὸν αὐτὸν δὲ³ τρόπον δοκεῖ λανθάνειν καὶ ὅσα
 20 φαίνεται τίκτεσθαι πολυχρονιώτερα τῶν ἔνδεκα⁴
 μηνῶν· καὶ γὰρ τούτων ἡ τῆς συλλήψεως ἀρχὴ
 λανθάνει τὰς γυναῖκας· πολλάκις γὰρ πνευματι-
 κῶν γενομένων⁵ ἔμπροσθεν τῶν ὑστερῶν, μετὰ
 ταῦτα πλησιάσασαι καὶ συλλαβοῦσαι ἐκείνην
 οἴονται τὴν ἀρχὴν εἶναι τῆς συλλήψεως, δι' ἣν
 25 ἐχρήσαντο τοῖς σημείοις ὁμοίοις.⁶

 τὸ δὲ δὴ πλῆθος τῶν τόκων τῆς τελειώσεως
 παρὰ τὰλλα ζῶα τοῖς ἀνθρώποις ταύτην ἔχει τὴν
 διαφοράν· καὶ τῶν μὲν μονοτόκων ὄντων τῶν δὲ

¹ αἱ γυναῖκες συμβάλλουσαι ... γυναῖκες β L^{rec.} Ald.: αἱ
 γυναῖκες α γ: αἱ δὲ γυναῖκες πονοῦσι G^arec. Q: αἱ γυναῖκες
 πονοῦσιν αἱ γυναῖκες m^{rec.}: non custodiebant ipsum tempus
 impregnationis. et mulieres plures dolebunt Scot. (sim.
 Alb.): latere ipsas mulieres concipientes prius. dolent
 autem maxime mulieres Guil.: errasse in conceptione
 matres arbitrantur. mulieres autem maxime laborant
 Trap.: mulierem sui conceptus initium latuisse. infestantur
 maxime mulieres Gaza: συλλαβοῦσαι coni. Bas. edd.

² codd. Ald.: ipsae Guil. Gaza: αὗται edd.

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The women suffer most during the fourth month and the eighth, and if they abort at the fourth or eighth month they too perish as a rule, so that not only do the eight-month children not live but in their destruction the mothers are at risk.

In the same way it is thought to be a mistake when children appear to be born later than the eleven^a months; for in their case too the women are mistaken about the beginning of the conception. For often when there has previously been wind in the uterus, and later they have intercourse and conceive, they think that the previous condition was the beginning of the conception, since it caused them similar symptoms.

The multiplicity, then, in the completing of births presents this difference as between humans and the other animals; also while some animals are uni-

^a See app. crit. The variant "ten" is accepted by A.-W., Karsch, Vegetti, comparing Hipp. *nat. p.* 30 (VII 532-4 L), which gives ten months as the limit and similarly says that women are misled by wind in the uterus. There is however no other similarity between Hipp. and Arist. here, and since eleven months was allowed at 584b1 it seems likely here too.

³ om. β (exc. V^crec.) Ald.

⁴ δεκαμήνων β (exc. V^crec.): *decimum* Scot.: *xi* Guil. Trap.: *undecimo* Gaza

⁵ γινωμένων β E^a P K^c M^c

⁶ om. β (exc. V^crec.) E^a Ald.

- πολυτόκων, ἐπαμφοτερίζει τὸ γένος τὸ τῶν
 30 ἀνθρώπων. τὸ μὲν γὰρ πλείστον καὶ παρὰ τοῖς
 πλείστοις ἐν τίκτουσιν αἱ γυναῖκες, πολλάκις δὲ
 καὶ πολλαχοῦ διδύμα, οἷον καὶ περὶ Αἴγυπτον.
 τίκτουσι δὲ καὶ τρία καὶ τέτταρα, περὶ ἐνίους μὲν
 καὶ σφόδρα τόπους, ὥσπερ εἴρηται¹ πρότερον.
 πλείστα δὲ τίκτεται πέντε τὸν ἀριθμόν· ἥδη γὰρ
 ὤπται τοῦτο² καὶ ἐπὶ πλειόνων συμβεβηκός. μία
 35 δέ τις ἐν τέτταρσι τόκοις ἔτεκεν εἴκοσιν· ἀνὰ
 πέντε γὰρ ἔτεκε, καὶ τὰ πολλὰ αὐτῶν ἐξετράφη.
 ἐν μὲν οὖν τοῖς ἄλλοις ζώοις, κἂν ἢ τὰ διδύμα
 585a ἄρρεν καὶ θῆλυ, οὐθὲν ἦττον ἐκτρέφεται γενό-
 μενα³ καὶ σώζεται τῶν ἀρρένων ἢ θηλειῶν· ἐν δὲ
 τοῖς ἀνθρώποις ὀλίγα σώζεται τῶν διδύμων ἐὰν
 ἦ τὸ μὲν θῆλυ τὸ δ' ἄρρεν.

- δέχεται δ' ὀχείαν κύοντα μάλιστα τῶν ζώων
 γυνὴ καὶ ἵππος· τὰ δ' ἄλλα ὅταν πληρωθῇ
 5 φεύγει τοὺς ἄρρενας, ὅσα μὴ πέφυκεν ἐπικυλίσκε-
 σθαι καθάπερ δασύπους. ἀλλ' ἵππος μὲν ἂν
 συλλάβῃ τὸ πρῶτον, οὐκ ἐπικυλίσκεται πάλιν,
 ἀλλ' ἐν τίκτει μόνον ὥς ἐπὶ τὸ πολὺ· ἐπ'
 ἀνθρώπῳ δ' ὀλίγα μὲν, γέγονε δέ ποτε. τὰ μὲν
 οὖν ὕστερον πολλῷ χρόνῳ συλληφθέντα οὐδὲν
 10 λαμβάνει τέλος, ἀλλὰ πόνον παρασχόντα συνδια-

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parous and others multiparous, the human kind tends to both sides. For although women mostly, and among most peoples, bear single children, frequently and in many places they have twins, as indeed in Egypt. They even bear three or four, especially in certain places as we have said before.^a The greatest number at a birth is five: this has already been seen to happen in several cases. One particular woman bore twenty in four births; she bore five at a time, and most of them were successfully reared. Now in the other animals, even if the twins are male and female, they are successfully reared after birth and survive no less than twin males or twin females; but in humans few twins survive if one is female and one male.

Coition during pregnancy is accepted by woman and mare more than by other animals; the others after impregnation avoid the males, except where superfetation is natural, as in the hare. But whereas there is no superfetation in the mare after the initial conception, but it bears only one foal as a rule, in man on the other hand superfetation though rare has sometimes occurred. Now those conceived a long time later do not reach completion, but after causing pain they bring about abortion of the earlier

^a 584b7.

¹ εἰρ. καὶ β

² τοῦτο post πλειόνων transp. β

³ γινόμενα β P L^c m n: γεννώμενα E^a

- φθείρει τὸ προϋπάρχον (ἤδη γὰρ συνέβη γενο-
 μένης διαφθορᾶς καὶ δώδεκα ἐκπεσεῖν τὰ ἐπι-
 κυηθέντα). ἐὰν δ' ἐγγὺς ἦ σύλληψις ἐγένετο,
 ἐπικυηθὲν¹ ἐξήνεγκαν καὶ τίκτουςιν ὥσπερ
 δίδυμα γόνῳ, καθάπερ καὶ τὸν Ἴφικλέα καὶ τὸν
 15 Ἡρακλέα μυθολογοῦσιν. γέγονε γὰρ καὶ τοῦτο
 φανερόν· μοιχευομένη γάρ τις τὸ μὲν τῶν
 τέκνων τῷ ἀνδρὶ ἑοικὸς ἔτεκε, τὸ δὲ τῷ μοιχῷ.
 ἤδη δὲ καὶ δίδυμα κύουσά τις ἐπεκύησε τρίτον,
 γενομένου δὲ τοῦ χρόνου τοῦ καθήκοντος τὰ μὲν
 τελεόγονα τῷ χρόνῳ ἔτεκε, τὸ δὲ πεντάμηνον·
 καὶ τοῦτ' ἀπέθανεν εὐθύς. καὶ ἑτέρα δέ τινα
 20 συνέβη τεκούσῃ πρώτον μὲν ἐπτάμηνον, ὕστερον
 δὲ δύο τελεόμηνα τεκεῖν· καὶ τούτων τὸ μὲν ἐτε-
 λεύτησε τὰ δὲ ἐβίωσεν. καὶ ἐκτιτρώσκουσαι δέ
 τινες συνέλαβον² ἅμα, καὶ τὸ μὲν ἐξέβαλον τὸ δ'
 ἔτεκον.

- ταῖς δὲ πλείσταις, ἐὰν συγγένωνται κυούσαις
 μετὰ τὸν ὄγδοον μῆνα, περίπλεων μυξώδους τὸ
 25 παιδίον ἐξέρχεται³ γλισχρότητος. καὶ τῶν ἐδεσ-
 μάτων δὲ τῶν προσφερομένων περίπλεων φαίνεται
 πολλάκις. καὶ τῷ ἁλὶ δαψιλεστέρῳ χρησαμένων

¹ ante ἐπικ. add. τὸ A^arec. S^crec. L^c m Ald. edd.: *super-
 conceptum* Guil. Trap.: *quod superfoetarit* Gaza

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embryo as well (for it happened before now that after an abortion as many as twelve embryos fell out, which were due to superfetation); but if the conception took place soon after, they have carried it to term as a superfetation and deliver them like twins from one seed, as in the myth of Iphicles and Heracles.^a For there has been actually the following evidence. An adulteress bore one child like her husband, the other like the adulterer. And a woman already pregnant with twins conceived a third by superfetation, and when the due time had come she delivered the twins fully developed at term, but the third as a five-month child which died immediately. To yet another woman it happened that she delivered first a seven-month child, and later delivered two of full term; of these the first died but the others lived. Some women too have conceived at the same time as miscarrying, and have lost the one child but borne the other.

In most cases if intercourse takes place with women more than eight months pregnant, the baby comes out full of mucous slime. Often too it is seen to be full of foodstuffs that have just been served. And when the mothers have taken salt too liberally,

^a Sons of Alcmene born as twins, Heracles having been fathered by Zeus, Iphicles by Amphytrion one night later. Cf. Hesiod *Shield* 1-56.

² συνέλαβον β (exc. S^c)

³ ἐξέρχεται β (exc. R^c S^c): *egreditur* Guil.: *exit* Gaza

οὐκ ἔχοντα γίνεται τὰ παιδιά ὄνυχας.

V τὸ δὲ γάλα τὸ γινόμενον πρότερον τῶν ἑπτὰ
30 μηνῶν ἄχρηστόν ἐστιν· ἀλλ' ἅμα τὰ τε παιδιά
γόνιμα καὶ τὸ γάλα χρήσιμον. τὸ δὲ πρῶτον καὶ
ἀλμυρόν, ὥσπερ τοῖς προβάτοις. μάλιστα δ' ἐν
ταῖς κυήσεσι τοῦ οἴνου αἰσθάνονται αἱ πλείσται·
διαλύονται τε γὰρ ἐὰν πίνωσι¹ καὶ ἀδυνατοῦσιν.

ἀρχὴ δὲ ταῖς γυναιξὶ τοῦ τεκνοῦσθαι καὶ τοῖς
35 ἄρρεσι τοῦ τεκνοῦν, καὶ παῦλα ἀμφοτέροις, τοῖς
μὲν ἢ τοῦ σπέρματος πρῶσις ταῖς δ' ἢ τῶν
585b καταμηνίων, πλὴν οὐτ' ἀρχομένων γόνιμα εὐθὺς
οὐτ' ἔτι ὀλίγων γιγνομένων καὶ ἀσθενῶν. ἡλικία
δὲ τῆς μὲν ἀρχῆς εἴρηται· παύεται δὲ ταῖς
γυναιξὶ ταῖς μὲν πλείσταις τὰ καταμήνια περὶ
τετταράκοντα ἔτη, αἷς δ' ἂν ὑπερβάλῃ² τὸν
χρόνον τοῦτον διαμένει μέχρι τῶν³ πεντήκοντα
5 ἐτῶν, καὶ ἤδη τινὲς ἔτεкон· πλείω δὲ χρόνον
οὐδεμία.

VI οἱ δ' ἄνδρες οἱ μὲν³ πλείστοι γεννῶσι μέχρι
ἐξήκοντα ἐτῶν, ὅταν δ' ὑπερβάλῃ ταῦτα μέχρι
ἐβδομήκοντα· καὶ ἤδη⁴ τινὲς γεγεννήκασιν ἐβδο-
μήκοντα ἐτῶν ὄντες.

συμβαίνει δὲ πολλοῖς καὶ πολλαῖς γυναιξὶ καὶ
10 ἀνδράσι μετ' ἀλλήλων μὲν συνεζευγμένοις μὴ

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the babies are born without nails.

The milk that comes before seven months is use- V
less; but the babies become fertile^a and the milk
useful at the same time. The first milk is also salty,
as in sheep. During pregnancies most women are
especially sensitive to wine: after drinking they
become relaxed and incapacitated.

The beginning of childbearing in the women and
of procreation in the males, and their cessation in
each, is determined by the emission of seed in the
latter and of menses in the former, except that they
are not fertile immediately when the emissions
begin, nor any longer when they become few and
weak. The age when they begin has been stated.^b
The menses cease in most women at about forty
years, but wherever they exceed this time they con-
tinue up to fifty years, and there have been some
who gave birth; but none has continued longer.

Most men procreate up to sixty years; if they VI
exceed that, up to seventy; and there have been
some who procreated when seventy years old.

It happens to many husbands and wives that
they cannot produce children in union with each

^a That is, viable, as at 583b31, 584a1, b3.

^b 581a13, 31.

¹ πίνωσι β

² ὑπερβάλλη β P K^c M^c

³ om. β

⁴ ἡδὲ δὲ β γ (exc. L^c)

δύνασθαι τεκνοποιεῖσθαι, διαζευχθεῖσι δέ. τὸ δ'
 αὐτὸ συμβαίνει καὶ περὶ ἀρρενογονίας καὶ θηλυ-
 γονίας· ἐνίοτε γὰρ καὶ γυναῖκες καὶ ἄνδρες μετ'
 ἀλλήλων μὲν ὄντες θηλυγόνοι εἰσὶν ἢ ἀρρενο-
 γόνοι, διεζευγμένοι δὲ γίνονται τοῦναντίον. καὶ
 15 κατὰ τὴν ἡλικίαν δὲ μεταβάλλουσιν· νέοι μὲν
 ὄντες μετ' ἀλλήλων θήλεα γεννῶσι, πρεσβύτεροι
 δ' ἄρρενα· τοῖς δὲ καὶ ἐπὶ τούτων συμβαίνει τοῦ-
 ναντίον. καὶ ἐπὶ τοῦ γεννᾶν δ' ὅλως τὸ αὐτό·
 νέοις μὲν οὖσιν οὐθέν γίνεται, πρεσβυτέροις δέ·
 οἱ δὲ τὸ πρῶτον, ὕστερον δὲ γεννῶσιν οὐδέν. εἰσὶ
 δὲ καὶ τῶν γυναικῶν τινες αἱ μόλις μὲν συλλαμ-
 20 βάνουσιν, ἔαν δὲ συλλάβωσιν ἐκφέρουσιν· αἱ δὲ
 τοῦναντίον συλλαμβάνουσι μὲν ῥαδίως, οὐ δύναν-
 ται δ' ἐκφέρειν. εἰσὶ δὲ καὶ ἄνδρες θηλυγόνοι καὶ
 γυναῖκες ἀρρενογόνοι, οἷον καὶ κατὰ τοῦ Ἡρα-
 κλέους μυθολογεῖται ὅς ἐν δύο καὶ ἑβδομήκοντα
 τέκνοις θυγατέρα μίαν ἐγέννησεν. αἱ δὲ μὴ
 25 δυνάμεναι συλλαμβάνειν, ἔαν ἢ διὰ θεραπείαν
 συλλάβωσιν ἢ δι' ἄλλην τινὰ σύμπτωσιν, ὥς ἐπὶ
 τὸ πολὺ θηλυτοκοῦσι μᾶλλον ἢ ἀρρενοτοκοῦσιν.
 πολλοῖς δὲ συμβαίνει καὶ τῶν ἀνδρῶν δυναμένοις
 γεννᾶν ὕστερον μὴ δύνασθαι, καὶ πάλιν καθίστα-
 σθαι εἰς αὐτό.

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other, but can when apart from each other. The same happens also with regard to producing males and females: sometimes both wives and husbands are female-producing or male-producing when they are with each other, but become the opposite when apart. And they change also with age: some generate females with each other when young, males when older; in others the opposite happens in this respect too. And in regard to generating altogether, the same happens: in some nothing is produced while they are young, but when they are older; others generate at first, but nothing later. And among the women there are some who have difficulty in conceiving, but if they have conceived they bear to term; others on the contrary conceive easily but cannot bear to term. Also there are men who generate females and women who generate males, as in the myth about Heracles who generated one daughter in seventy-two children. If women who cannot conceive have been enabled to do so by treatment or by some other adventitious circumstance, they tend to bear females as a rule rather than males. It happens also to many men who are able to generate that later they are unable, and then are restored to it again.

γίνονται δὲ καὶ ἐξ ἀναπήρων ἀνάπηροι, οἷον ἐκ
 30 χλωῶν χωλοὶ καὶ τυφλῶν τυφλοί, καὶ ὅλως τὰ
 παρὰ φύσιν ἐοικότες πολλάκις καὶ σημεῖα ἔχοντες
 συγγενῇ οἷον φύματα καὶ οὐλάς. ἤδη δ' ἀπέδωκε
 τῶν τοιούτων τι καὶ διὰ τριῶν, οἷον ἔχοντός τινος
 στίγμα ἐν τῷ βραχίονι ὃ μὲν υἱὸς οὐκ ἐγένετο ὃ δ'
 υἱδοῦς ἔχων ἐν τῷ αὐτῷ τόπῳ συγκεχυμένον
 35 μέλαν. ὀλίγα μὲν οὖν γίνεται τὰ τοιαῦτα, τὰ δὲ
 πλείστα οὐ γίνεται ἀλλ' ¹ ὁλόκληρα ἐκ κολοβῶν
 586a καὶ οὐθὲν ἀποτέτακται τούτων. καὶ ἐοικότες δὲ
 τοῖς γεννήσασιν ἢ τοῖς ἄνωθεν γονεῦσιν, ὅτε δ'
 οὐδὲν οὐδενί. ἀποδίδωσι δὲ καὶ διὰ πλειόνων
 γενῶν, οἷον ἐν Σικελίᾳ ἢ τῷ Αἰθίοπι μοιχευθεῖσα.
 ἢ μὲν γὰρ θυγάτηρ ἐγένετο οὐκ Αἰθίοψ, τὸ δ' ἐκ
 5 ταύτης. καὶ ὥς μὲν ἐπὶ τὸ πολὺ τὰ θήλεα ἔοικε
 τῇ μητρὶ μάλλον, τὰ δ' ἄρρενα τῷ πατρὶ· γίνεται
 δὲ καὶ τοῦναντίον, τὰ μὲν θήλεα τῷ πατρὶ τὰ δ'
 ἄρρενα τῇ μητρὶ. καὶ κατὰ μέρη δὲ γίνονται ἐοι-
 κότα ἄλλα μέρη ἐκατέρων. τὰ δὲ διδυμα ἤδη μὲν

¹ πλείστα οὐ γίνεται ἀλλ' β *L^crec.* Ald. Dt.: πλ. γίν. ἀλλ' C^a
A^apr. G^a Q E^a P K^c M^c Guil.: πλ. γίν. A^arec. F^a X^cpr. m n Bk.

^a Both Arist. and the Hippocratics accept reports of the inheritance of acquired characteristics, but both treat them with reserve: cf. GA I 721b29, 724a3; Hipp. *Airs* 14 (II 60 L), *Genit.* 11 (VII 484 L).

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There are also births of defective children from defective parents, for example lame from lame and blind from blind, and in general children who often resemble them in respect of unnatural features and possess from birth such marks as growths and scars.^a There has been a case of such a mark returning in the third generation: a man had a tattoo on his arm, which his son did not have but his grandson was born with it in the same place, blurred and dark. Now such features are few, and in most cases they do not occur but the children of defective parents are completely sound and there is no special rule regarding them. Also there are those who look like their parents or their earlier forebears, and sometimes like none. And there is the return of a resemblance after an interval of several generations, for example the woman in Sicily^b who committed adultery with the Ethiopian: for her daughter was born not Ethiopian, but the daughter's child was one. As a rule females tend to resemble the mother, males the father; but the opposite also happens, females resembling the father and males the mother. And part for part too there are resemblances to other parts on each side of the family.^c There have been twins born unlike each

^b Given as "Elis" by William here and by *GA* I 722a9, *Antig.* 122, *Arist. Byz. epit.* II 272, but as "Byzantium" by *Pliny* VII 12. 51.

^c The expression is so condensed that editors have rewritten it in various ways, but the sense is not in doubt: both males and females may resemble one parent in some parts and the other in other parts. (Cf. *GA* IV 768b2.)

- ἐγένετο καὶ οὐκ ἔοικότα ἀλλήλοις, τὰ μέντοι¹
 10 πλείστα καὶ ὥς ἐπὶ τὸ πολὺ ἔοικότα, ἐπεὶ καὶ
 μετὰ τὸν τόκον τις ἐβδομαία συγγενομένη καὶ
 συλλαβοῦσα² ἔτεκε τὸ ὕστερον τῷ προτέρῳ ἔοικὸς
 ὥσπερ δίδυμον. εἰσὶ δὲ καὶ γυναῖκες ἔοικότα
 ἑαυταῖς γεννῶσαι, αἱ δὲ τῷ ἀνδρί, ὥσπερ ἡ ἐν
 Φαρσάλῳ ἵππος ἡ Δικαία καλουμένη.
- VII ἐν δὲ τῇ τοῦ σπέρματος ἐξόδῳ πρῶτον μὲν
 16 ἡγεῖται πνεῦμα· δηλοῖ δὲ καὶ ἡ ἔξοδος ὅτι γίνε-
 ται ὑπὸ πνεύματος, οὐθὲν γὰρ ῥίπτεται πόρρω
 ἄνευ βίας πνευματικῆς· ὅταν δὲ λάβηται τὸ
 σπέρμα τῆς ὑστέρας καὶ ἐγχρονισθῇ, ὑμὴν περι-
 λισταται. φαίνεται γάρ, ὅταν πρὶν διαρθρωθῆναι
 20 ἐξέλθῃ, οἷον ὦν ἐν ὑμένι περιεχόμενον ἀφαιρε-

¹ β Prec. Dt.: μὲν C^a A^apr. G^a Q E^a Ppr. K^c M^c: δὲ A^arec. F^a X^c L^c m n Ald. Bk.

² συλλαμβάνουσα β E^a P K^c M^c

^a Cf. *Pol.* II 1262a23, where Newman's note (*The Politics of Aristotle*, Oxford 1887, Vol. II p. 240) gives other references to this story. In producing offspring like the sire, the mare made a just return upon his investment (τόκος, offspring, may also mean financial produce; there is often a play between the two ideas, cf. LSJ s.v.); she was therefore both a virtuous and an honest wife.

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other; in most cases however and in most respects they are alike; for even after childbirth a woman who had intercourse a week later, and conceived, delivered the later child as like to the earlier as a twin. And there are women who generate children like themselves, while others generate them like the husband, as did the mare of Pharsalus named "The Just".^a

In the outflow of the seed, wind first leads it; and the actual outflow shows that it occurs under the compulsion of wind, for nothing is thrown to a distance without the force of wind.^b And when the seed has taken hold of the uterus and has remained inside for a time, a membrane sets around it.^c For when it comes out before being articulated, it looks like an egg enclosed in membrane after the shell has

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^b For the theory that *pneuma* (wind) is present, cf. *PA* IV 689a30, *GA* I 718a3, 728a10.

^c Like VI 559b8, this implies that the male seed is physically retained, contrary to the theory of *GA* II 737a11. It was the normal view that, whatever the mother might or might not contribute, the father's seed becomes the embryo (*Hipp. nat. puer.* 12, VII 488 L). These expressions in *HA*, however, clearly correspond to longer accounts in *GA* (739b20, 751b31, 758b2), while being themselves brief and summary, so that the apparent contradiction may be unintentional.

θέντος τοῦ ὀστράκου· ὁ δ' ὑμὴν φλεβῶν μεστός.
 πάντα δὲ τὰ πλωτὰ καὶ πτηνὰ καὶ πεζά, εἴτε
 ζωοτοκεῖται ἢ ὠοτοκεῖται, ὁμοίως γίνεται, πλὴν
 τὸν ὀμφαλὸν τὰ μὲν πρὸς τὴν ὑστέραν ἔχει τὰ
 ζωοτοκοῦμενα, τὰ δὲ πρὸς τῷ ὠῷ, τὰ δ' ἀμφο-
 25 τέρως οἶον ἐπὶ γένους τινὸς ἰχθύων. καὶ τὰ μὲν
 περιέχουσιν¹ ὑμένες, τὰ δὲ χορίω² περιέχονται.³
 καὶ πρῶτον μὲν τοῦ ἐσχάτου χορίου⁴ ἐντὸς
 γίνεται τὸ ζῶον, εἴθ' ὑμὴν περὶ τοῦτον ἄλλος, τὸ
 μὲν πλεῖστον προσπεφυκῶς⁵ τῇ μήτρᾳ, τῇ δ'
 ἀφесτῶς καὶ ὕδωρ ἔχων. μεταξὺ δ' ὑγρότης
 ὕδατῶδης καὶ ἰχωρῶδης ἢ αἱματῶδης,⁶ ὁ καλού-
 30 μενος ὑπὸ τῶν γυναικῶν πρόφορος.

VIII αὐξάνεται δὲ τὰ ζῶα πάντα ὅσα ἔχει ὀμφαλὸν
 διὰ τοῦ ὀμφαλοῦ. ὁ δ' ὀμφαλός, ὅσα μὲν κοτυλη-

¹ περιεχ. οἶον α γ Ald. Gaza edd.

² χορίω A^arec. F^a X^c β γ Ald.: χόρια C^a edd.: χωρίω A^apr. G^a
 Q Ppr. n: locelli Guil.: loculi atque secundinae Trap.:
 secundis Gaza

³ om. C^a A^apr. G^a Q Guil. Trap. edd.

⁴ A^arec. F^a X^c Pcorr. L^c mcorr. n Ald.: χωρίου cett.: om. C^a
 Guil. edd.: *loculo* Trap.: *inuolucrum* Gaza

⁵ προσπεφυκός A^a G^a Q P: προσπέφυκε β L^crec. nrec. Guil.

⁶ ὕδατῶδης καὶ ἰχ. ἢ αἷμ. β L^crec. Ald.: ὕδατ. καὶ αἷμ. α E^a
 Guil. Trap.: ὕδατ. καὶ ἰχ. ἢ αἷμ. καὶ ὠματῶδης P K^c M^c: ὕδατ.

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been removed^a; the membrane is full of blood vessels. All animals that swim, fly or walk, whether viviparous or oviparous, are produced similarly, except that in some the umbilicus goes to the uterus (i.e. in the vivipara), but in others is fixed to the egg, while some have it both ways (as in the case of a certain kind of fishes).^b They are enclosed partly by membranes, partly by a chorion.^c And first the animal develops within the inmost chorion, then another membrane develops around this one, mostly growing on to the womb but partly standing away and holding water. In between is fluid that is watery and serous or sanguineous, what the women call 'the fore-runner'.^d

The growth of all animals that have an umbilicus is obtained through the umbilicus. In those that

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^a Cf. Hipp. *nat. p.* 13 (VII 490 L).

^b The ovo-viviparous selachians, VI 565b5, GA III 754b30; but it is not clear whether the reference here is actually to the dogfish placenta.

^c Arist. uses "chorion" for a membrane enclosing a foetus, not exclusively the outer membrane (cf. VI 561b32-562a6). Here the expression recalls VI 565b10 and GA II 739b31, 745b35, 746a18.

^d The discharge which both announces and brings the child, in English "the waters".

καὶ ἰχ. L^εpr.: αἶμ. καὶ ἵδατ. m Gaza: ἰχ. καὶ αἶμ. καὶ ἵδατ. n: aquosa Scot. Alb.: ἵδατ. ἢ αἶμ. Bk.

δόνας ἔχει, πρὸς τῇ κοτυληδόνι προσπέφυκεν,
 ὅσα δὲ λείαν¹ ἔχει τὴν ὑστέραν, πρὸς τῇ ὑστέρα
 35 ἐπὶ φλεβός. σχῆμα δ' ἔχει ἐν τῇ ὑστέρα τὰ μὲν
 τετράποδα πάντα ἐκτεταμένα, καὶ τὰ ἄποδα
 586b πλάγια οἶον ἰχθύς, τὰ δὲ δίποδα συγκεκαμμένα
 οἶον ὄρνις· καὶ ἄνθρωπος συγκεκαμμένος, καὶ²
 ῥίνα μὲν μεταξὺ τῶν γονάτων ἔχουσιν,³ ὀφθαλ-
 μούς δ' ἐπὶ τοῖς γόνασιν, ὦτα δ' ἐκτός. ἔχει δ'
 ὁμοίως πάντα τὰ ζῶα τὴν κεφαλὴν ἄνω τὸ
 5 πρῶτον· αὐξανόμενα δὲ καὶ πρὸς τὴν ἔξοδον
 ὀρμῶντα κάτω περιάγεται, καὶ ἡ γένεσις ἐστὶν ἡ
 κατὰ φύσιν πᾶσιν πᾶσιν ἐπὶ κεφαλὴν· συγκε-
 καμμένα δὲ καὶ ἐπὶ πόδας γίνεται παρὰ φύσιν.

τὰ δὲ τῶν τετραπόδων ἔχει καὶ περιττώματα
 ὅταν ἤδη τέλεια ᾖ, καὶ ὑγρὸν καὶ σφυράδας,⁴
 10 τὰς⁵ μὲν ἐν τῷ ἐσχάτῳ τοῦ ἐντέρου, ἐν δὲ τῇ
 κύστει οὖρον.

τοῖς δ' ἔχουσι κοτυληδόνας ἐν τῇ μήτρᾳ τῶν
 ζώων αἰεὶ ἐλάττους γίνονται αἱ κοτυληδόνες
 αὐξανομένου τοῦ ἐμβρύου, καὶ τέλος ἀφανίζονται.
 ὁ δ' ὁμφαλός ἐστι κέλυφος περὶ φλέβας, ὧν ἡ
 ἀρχὴ ἐκ τῆς ὑστέρας ἐστί, τοῖς μὲν ἔχουσι τὰς⁶

¹ λῖαν β (exc. S^c O^c corr.): planam Guil.: laevis Gaza

² om. α γ (exc. L^c rec.) Guil. edd.

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have cotyledons^a the umbilicus is attached to the cotyledon, while in those whose uterus is smooth it is attached to the uterus at a blood vessel. Within the uterus all quadrupeds are in an extended attitude, and the footless animals are on their sides (e.g. fish), but the bipeds are bent up (e.g. bird); man too is bent up, and has the nose between the knees, eyes on the knees, ears outside them. All animals alike have the head up^b at first, but as they grow bigger and start moving towards the outlet they turn downwards, and birth is naturally head-first for all, though some are born bent up and feet-first contrary to nature.

Quadruped embryos contain excrements too, when their development is complete, both liquid and solids, the latter in the last part of the intestine and urine in the bladder.

In those animals that have cotyledons in the womb the cotyledons become progressively smaller as the embryo grows, and finally disappear. The umbilicus is a sheath around blood vessels which originate from the uterus (from the cotyledons in

^a Small cavities in the uterus wall, acting like suckers, to which the embryo is attached: GA II 745b22-746a28, HA III 511a30, X 635b3.

^b That is, forward, towards the mother's head; this is the correct use of the term as in GA (cf. IA ch. 4).

³ β L^crec. Guil. Ald.: om. α γ Cs. Bk.

⁴ om. β ⁵ $\tau\alpha$ α β L^crec. ⁶ om. F^a X^c β E^a

- 15 κοτυληδόνας ἐκ τῶν κοτυληδόνων, τοῖς δὲ μὴ
 ἔχουσιν ἀπὸ φλεβός. εἰσὶ δὲ τοῖς μὲν μεΐζουσιν,
 οἷον τοῖς τῶν βοῶν ἐμβρύοις, τέτταρες αἱ
 φλέβες, τοῖς δ' ἐλάττωσι δύο, τοῖς δὲ πάμπαν
 μικροῖς οἷον ὄρνισι μία φλέψ. τείνουσι δ' εἰς τὰ
 ἔμβρυα αἱ μὲν δύο διὰ τοῦ ἥπατος, ἥ αἱ καλού-
 μεναι πύλαι εἰσὶ, πρὸς τὴν φλέβα τὴν μεγάλην,
 20 αἱ δὲ δύο πρὸς τὴν ἀορτὴν, ἥ¹ σχίζεται² καὶ
 γίνεται ἡ ἀορτὴ δύο ἐκ μιᾶς. εἰσὶ δὲ περὶ τὴν
 συζυγίαν ἑκατέραν τῶν φλεβῶν ὑμένες, περὶ δὲ
 τοὺς ὑμένας ὁ ὀμφαλὸς οἷον ἔλυτρον. αὐξανομέ-
 νων δ' αἰεὶ μᾶλλον συμπίπτουσιν αὗται αἱ φλέβες.
 25 τὸ δ' ἔμβρυον ἀδρυνόμενον εἰς τε τὰ κοῖλα ἔρχε-
 ται, καὶ ἐνταῦθα δῆλόν ἐστι κινούμενον, καὶ
 ἐνίοτε κυλινδεῖται περὶ τὸ αἰδοῖον.

- IX ὅταν δ' ὠδίνωσιν αἱ γυναῖκες, εἰς πολλὰ μὲν
 καὶ ἄλλα ἀποστηρίζονται αὐταῖς³ οἱ πόνοι, ταῖς
 δὲ πλείσταις εἰς ὁποῖον ἂν τύχῃ τῶν μηνῶν.
 30 ὅσαι δ' ἂν περὶ τὴν κοιλίαν σφοδρότατοι γένων-
 ται⁴ πόνοι, αὗται τάχιστα τίκτουςιν· καὶ ὅσαι
 μὲν τὴν ὀσφύν προαλοῦσι μόλις τίκτουςιν, ὅσαι
 δὲ τὸ ἦτρον ταχύ. ἂν μὲν οὖν ἀρρενοτοκῇ προέρ-

¹ ἢ A^a G^apr. Q: om. β L^crec.

² σχίζονται β L^crec. Guil.

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those that have the cotyledons, but from a blood vessel in those that do not have them). In the larger animals such as cattle embryos the blood vessels are four, in the smaller two, and in the very small such as birds there is one blood vessel. They lead into the embryos, two through the liver (where the so-called gates^a are) to the great blood vessel,^b and the other two to the aorta where it divides^c and the aorta becomes two out of one. Around each pair of blood vessels there are membranes, and around the membranes is the umbilicus like a case. As the embryos grow these blood vessels progressively shrink. The embryo as it matures goes into the hollows and there its movement is evident, and sometimes it rolls over in the area of the genitalia.

When women are in labour, their pains become IX centred on any one of several parts, but in most women it is on one or other thigh. Those whose pains are severest around the belly are the quickest to deliver; those that have preliminary pain in the loins have a difficult delivery, while those that have it in the lower abdomen are quick. Now if they bear

^a Cf. I 496b32, Eurip. *El.* 828, Plat. *Tim.* 71C, Hipp. *morb. vulg.* II 4. 1 (V 122 L).

^b The vena cava, cf. III 513b1.

^c The variant reading is "they divide".

³ αὐτοῖς A^a G^a Q F^apr. S^c Bk.

⁴ γίνονται β (exc. S^c) Ald.: γίνονται S^c L^c Pk

χονται οἱ ἰχῶρες ὑδαρεῖς ὑπώχροι, ἐὰν δὲ θηλυ-
τοκῇ αἵματώδεις, ὑγροὶ δὲ καὶ οὗτοι· ἐνίαις
35 μέντοι συμβαίνει περὶ τὰς ὠδῖνας καὶ οὐδέτερα
τούτων. τοῖς μὲν οὖν ἄλλοις ζώοις οὐκ ἐπίποναι
587a γίνονται οἱ τόκοι, ἀλλὰ μετριοτέρως ἐπιδηλά
ἐστὶν ἐνοχλούμενα ὑπὸ τῆς ὠδῖνος· ταῖς δὲ
γυναιξὶ συμβαίνουσιν οἱ πόνοι ἰσχυρότεροι, καὶ
μάλιστα ταῖς ἐδραῖαις καὶ ὅσαι μὴ εὐπλευροί
μηδὲ δύνανται τὸ πνεῦμα κατέχειν. δυστοκοῦσι
5 δὲ μᾶλλον καὶ ἐὰν μεταξὺ ἀποπνεύσωσιν ἀπο-
βιαζόμεναι τῷ πνεύματι. πρῶτον μὲν οὖν ὑδρωψ
ἐξέρχεται γινομένου τοῦ ἐμβρύου καὶ ῥηγνυμένων
τῶν ὑμένων, ἔπειτα τὸ ἐμβρυον, στρεφομένων
μὲν τῶν ὑστερῶν καὶ τοῦ ὑστέρου τὰ ἔσω ἐκτὸς
ἰσχοντος.

X καὶ τῆς μαίας ἡ ὀμφαλοτομία μέρος ἐστὶν οὐκ
10 ἀστόχου διανοίας· οὐ γὰρ μόνον περὶ τὰς δυστο-
κίας τῶν γυναικῶν τῇ εὐχερείᾳ δύνασθαι δεῖ βοη-
θεῖν, ἀλλὰ καὶ πρὸς τὰ συμβαίνοντα ἀγχίνουν
εἶναι καὶ περὶ τὴν τοῦ ὀμφαλοῦ ἀπόδεσιν τοῖς
παιδίοις. ἐὰν μὲν γὰρ¹ καὶ τὸ ὑστερον συνεκ-
πέση, ἐρίῳ ἀποδεῖται ἀπὸ τοῦ ὑστέρου ὁ ὀμφαλὸς

¹ ἐὰν μὲν γὰρ E^bcorr. mcorr. Gaza Scal. edd.: ἐὰν μὴ γὰρ a
P K^c L^cpr. mpr. n Guil.: ἵνα γὰρ μὴ β Ald.: ἵνα μὴ γὰρ L^crec.:
ἐὰν γὰρ μὴ O^crec. M^c

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a male, the preceding fluids are watery and yellowish, but if they bear a female they are bloodlike though also watery; in some, however, neither of these fluids occurs at labour. Now in the other animals births are not painful, but they are evidently troubled to a more moderate extent by labour; but in women the pains occur with more strength, especially in sedentary women and those who are weak in the chest and unable to hold their breath.^a Labour is in fact more difficult if they let their breath go just when they are trying to exert force with the breath. Now first to come out is a watery discharge, when the embryo is being born^b and the membranes are rupturing, and then the embryo while the uterus is being everted and the afterbirth brings outside what was within.

Now for the midwife the cutting of the navel-cord X
is a duty requiring attention to the aim in view. For not only must she be able to help over difficult births with her dexterity, but she must also be quick-witted in dealing with contingencies, especially over the tying of the baby's navel-cord. For if the after-birth has fallen out too, the umbilicus is tied off from the afterbirth with wool, and is cut off above

^a Breath (pneuma, wind) provides force; cf. *Somn.* 456a16, *GA* II 737b36, *HA* X 636a6.

^b Lit. "coming to be". For this sense of *γίγνομαι* cf. 586b7, 587a24, b6, 12, 14.

- 15 καὶ ἀποτέμενεται ἄνωθεν· εἰ¹ δ'² ἀποδεθῇ συμφύεται, τὸ δὲ συνεχὲς ἀποπίπτει. ἐὰν δὲ λυθῇ τὸ ἄμμα, ἀποθνήσκει τοῦ αἵματος ἐκρυνέντος τὸ ἔμβρυον. ἐὰν δὲ μὴ συνεξέλθῃ εὐθὺς τὸ ὕστερον, ἔσω ὄντος αὐτοῦ, τοῦ παιδίου δ' ἔξω, ἀποτέμενεται ἀποδεθέντος τοῦ ὀμφαλοῦ. πολλάκις δ'
- 20 ἔδοξε τεθνεὺς³ τίκτεσθαι⁴ τὸ παιδίον ὅταν ἀσθενικοῦ ὄντος, πρὶν ἀποδεθῆναι τὸν⁵ ὀμφαλόν, τὸ αἷμα ἔξω εἰς τὸν ὀμφαλὸν καὶ τὸ πέριξ τύχῃ ἐξερρηγνός· ἀλλὰ τεχνικαί τινες ἤδη τῶν μαιῶν γενόμεναι ἀπέθλιψαν εἰσω ἐκ τοῦ ὀμφαλοῦ, καὶ εὐθὺς τὸ παιδίον, ὥσπερ ἔξαιμον γενόμενον πρότερον, πάλιν ἀνεβίωσεν.
- 25 γίνεται δέ, καθάπερ ἐλέχθη πρότερον, κατὰ φύσιν ἐπὶ κεφαλὴν καὶ τὰλλα ζῶα, τὰ δὲ παιδία καὶ τὰς χεῖρας παρατεταμένας παρὰ τὰς πλευράς. ἐξελθόντα δ' εὐθὺς φθέγγεται καὶ προσάγει πρὸς τὸ στόμα τὰς χεῖρας. ἀφίησι δὲ καὶ περιττώματα τὰ μὲν εὐθὺς τὰ δὲ διὰ ταχέων,
- 30 πάντα δ' ἐν ἡμέρᾳ· καὶ τοῦτο τὸ περίττωμα πλέον ἢ τοῦ παιδὸς κατὰ μέγεθος· ὃ καλοῦσιν αἱ γυναῖκες μηκώνιον. χρῶμα⁶ δὲ τούτου αἷμα-

¹ cett.: ἡ O^c corr. mcorr. : si Guil.: qua Gaza: ἡ Sylb. edd.

² δ' ἄν conl. Sn. Bk. Dt.

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that point; and if it has been tied off it grows together, and the adjoining part falls off. But if the knot has come undone, the blood runs out and then the embryo dies. But if the afterbirth has not immediately come out too, but remains inside while the baby is outside, it is cut away after the umbilicus has been tied off. Often the baby has seemed to be born dead when—it being a weakly child—before the umbilicus has been tied off the blood happens to have run out into the umbilicus and the surrounding part; but certain midwives who have acquired this skill have squeezed the blood back inside, out of the umbilicus, and immediately the baby that had previously become as if bloodless has revived again.

The other animals too are naturally born head first, as we said before,^a but in addition human babies have their hands stretched out by their sides. After coming out they immediately give a cry and bring the hands up to the mouth. They discharge excrements too, some babies immediately, others after a short interval, but all within a day; and this excrement is more than proportional to the baby's size; the women call it 'poppy'.^b Its colour is blood-

^a 586b6.

^b "Poppy": meconium.

³ cett. Sylb.: τεθνεος C^a (ut vid.) F^a X^c m Ald. edd.

⁴ τικτ. τεθ. transp. β

⁵ τὸ β ⁶ χρῶμα ἐκ β

τῶδες καὶ σφόδρα μέλαν καὶ πιττῶδες, μετὰ δὲ
 τοῦτο ἤδη γαλακτῶδες· σπᾶ γὰρ εὐθύς καὶ τὸν
 μαστόν. πρὶν δ' ἐξελθεῖν οὐ φθέγγεται τὸ παι-
 δίον, κἂν δυστοκούσης τὴν κεφαλὴν μὲν ὑπερέχῃ
 35 τὸ δ' ὅλον σῶμα ἔχῃ ἐντός.

587b ὅσαις δ' ἂν ἐν ταῖς ἀποκαθάρσεσι προεξορμή-
 σωσιν οἱ καθαρμοί, δυσαπαλλακτότεραι γίνονται
 τῶν ἐμβρύων. ἐὰν δὲ αἱ¹ καθάρσεις μετὰ τὸν
 τόκον ἐλάττους γένωνται, καὶ ὅσων μόνον² αἱ
 πρῶται, καὶ μὴ διατελέσωσιν εἰς τὰς τετταρά-
 5 κοντα, ἰσχύουσί τε μᾶλλον αἱ γυναῖκες καὶ συλ-
 λαμβάνουσι θᾶπτον.

τὰ δὲ παιδιά ὅταν γένωνται μέχρι τῶν
 τετταράκοντα³ ἡμερῶν ἐγρηγορότα μὲν οὔτε
 γελαῖ οὔτε δακρύει, νύκτωρ δ' ἐνίοτε ἄμφω· οὐδὲ
 κνιζόμενα τὰ πολλὰ αἰσθάνεται, τὸ δὲ πλεῖστον
 καθεύδει τοῦ χρόνου. αὐξανόμενον δ' αἰεὶ εἰς τὸ
 10 ἐγρηγορέναι μεταβάλλει μᾶλλον· καὶ ἐνυπνιαζό-
 μενον δῆλον μὲν γίνεται, μνημονεύει δ' ὁψὲ τὰς
 φαντασίας.

τοῖς μὲν οὖν ἄλλοις ζώοις οὐδεμία διαφορὰ⁴

¹ om. α γ Bk.

² μόνων G^a Q β Ppr. (incert. L^c): om. T^c

³ μέχρι τῶν τετ. β L^crec. : τῶν τετ. C^a A^apr. G^a Qpr. Bk.:

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like and very dark and pitchlike, but after this it becomes milklike; for the baby draws immediately at the breast. But before coming out the baby makes no cry, even if during a difficult birth it has its head protruding but all its body inside.

Those who have premature discharges^a of the fluids tend to have a more difficult delivery of the embryos. And if the purgations become less after the birth, and if only the first ones occur and are not continued up to the forty days, the women both gain more strength and conceive sooner.

For the forty days after birth the babies neither laugh nor weep while awake, though at night they sometimes do both; nor in most cases do they feel tickling, but sleep for most of the time.^b But as the child grows it changes progressively to more wakefulness; and it shows that it has dreams, though it is a long time before it remembers its dream images.^c

Now in the other animals there is no difference in

^a καθάρσεις and καθαρμοί are not precise; here they refer to the "waters" (586a30, b32, 587a6), but in the next sentence they refer both to a post-natal discharge (as at 587b19) and to normal menstruation, which is their most usual reference (e.g. 587b30).

^b These statements agree with Hipp. *sept.* p. 9 as emended by Van der Linden (VII 450 note 11 L).

^c Dreaming in infancy is denied at IV 537b14 and *Insomn.* 461a12.

πρὸ τετ. A^arec. Qrec. F^a X^c γ Ald.

⁴ διαφθορὰ β L^crec. Ald.

τῶν ὀστέων, ἀλλὰ πάντα τετελεσμένα γίνεται·
 τοῖς δὲ παιδίοις τὸ βρέγμα λεπτόν¹ καὶ ὀψέ
 πήγνυται. καὶ τὰ μὲν ἔχοντα γίνεται ὀδόντας,
 15 τὰ δὲ παιδιά ἐβδόμῳ μηνὶ ἄρχονται ὀδοντοφυεῖν·
 φύει δὲ πρῶτον τοὺς προσθίους, καὶ τὰ μὲν τοὺς
 ἄνωθεν πρότερον, τὰ δὲ τοὺς κάτωθεν. πάντα δὲ
 θάπτον φύουσιν ὅσων αἱ τίτθαι θερμότερον ἔχουσι
 τὸ γάλα.

XI μετὰ δὲ τοὺς τόκους² καὶ τὰς καθάρσεις ταῖς
 20 γυναιξὶ τὸ γάλα πληθύνεται, καὶ ἐνίαις ρεῖ οὐ
 μόνον κατὰ τὰς θηλάς ἀλλὰ πολλαχῇ τοῦ μασ-
 τοῦ, ἐνίαις δὲ καὶ κατὰ τὰς μασχάλας. καὶ διαμέ-
 νουσιν εἰς τὸν ὕστερον χρόνον στραγγαλίδες ὅταν
 μὴ ἐκπεφθῇ μηδὲ ἐξέλθῃ ὑγρότης ἀλλὰ πλη-
 ρωθῇ· ἅπας γὰρ ὁ μαστὸς σομφός³ ἐστίν οὕτως
 25 ὥστε καὶ ἐν τῷ πόματι⁴ λάβωσι τρίχα πόνος
 ἐγγίνεται ἐν τοῖς μαστοῖς (ὃ καλοῦσι τριχίαν⁵)
 ἕως ἂν ἡ αὐτομάτῃ ἐξέλθῃ θλιβομένη ἢ μετὰ τοῦ
 γάλακτος ἐκθηλασθῇ. τὸ δὲ γάλα ἔχουσιν ἕως
 ἂν πάλιν συλλάβωσιν· τότε δὲ παύεται καὶ

¹ E^a Sylb. Dt.: μαλακὸν O^crec. m Scal. Cs. Sn. Bk.: ἁπαλὸν
 G^arec. Q Ott.: λευκὸν cett. Ald.: molle Scot. Guil. Trap. Gaza

² τοκετοὺς β L^crec. Ott.

³ σομφώδης β

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the bones, but all are born completely formed; but in human babies the bregma^a is delicate and is late in setting. And while the others are born with teeth, human babies begin to produce teeth in the seventh month; they first produce the front teeth, some the upper ones first, others the lower. And all produce them quicker if their nurses' milk is hotter.

After the birth and the purgations the women's milk becomes abundant, and in some it flows not only at the nipples but at many places on the breast and in some even at the armpits. And for a time afterwards there are persistent indurations, when fluid is not fully concocted and does not come out but accumulates; for the whole breast is porous to such a degree that if they swallow a hair in their drink, pain develops in the breasts (what they call hair-sickness)^b until the hair either comes out of its own accord when squeezed or is sucked out with the milk. They have milk until they have conceived again; then it stops and dries up alike in humans

XI

^a Over the anterior fontanelle, cf. I 491a31, GA II 744a26.

^b Trichiasis, in Greek medicine a term for several ailments attributed to hairs, not solely for irritation of the eyes. Hipp. *mul.* II 186 (VIII 366 L) describes a treatment for trichiasis of the breast, but shows no similarity with this passage.

⁴ πώματι C^a β: πόντω E^a

⁵ codd.: *pilosa* Scot.: *pilizare* Guil.: *pilare* Gaza: τριχῶν Sn. edd.

σβέννυνται ὁμοίως ἐπ' ἀνθρώπων καὶ τῶν ἄλλων
ζωοτόκων καὶ τετραπόδων.

30 τοῦ γάλακτος δ' ἐξιόντος οὐ γίνονται αἱ
καθάρσεις ὡς ἐπὶ τὸ πολὺ, ἐπεὶ ἤδη τισὶ θηλαζο-
μέναις ἐγένετο καθάρσεις. ὅλως δ' ἅμα πολλαχῇ
οὐ συμβαίνει ἡ ὁρμὴ τῆς ὑγρότητος, οἷον ταῖς
ἐχούσαις αἱμορροΐδας¹ χεῖρους αἱ καθάρσεις ἐπι-
γίνονται. ἐνίαις δὲ καὶ διὰ τῶν ἰσχυίων, ὅταν ἀπὸ
35 τῆς ὀσφύος ἐκκριθῇ, πρὶν ἐλθεῖν εἰς τὰς ὑστέρας.

588a καὶ ὅσαις δ' ἂν μὴ γινομένων τῶν καθαρσίων²
ἅμα³ συμπέσῃ ἐμέσαι, οὐθὲν βλάπτονται.

XII εἴωθε δὲ τὰ παῖδια τὰ πλεῖστα σπασμὸς ἐπι-
λαμβάνειν, καὶ μᾶλλον τὰ εὐτραφέστερα καὶ
5 γάλακτι χρώμενα καὶ⁴ πλείονι καὶ⁵ παχυτέρῳ
καὶ τίτθαις εὐσάρκοις. βλαβερὸν δὲ πρὸς τὸ
πάθος καὶ ὁ οἶνος ὁ μέλας μᾶλλον τοῦ λευκοῦ καὶ
ὁ μὴ ὑδαρῆς, καὶ τὰ πλεῖστα τῶν φυσιωδῶν, καὶ

¹ F^a X^c M^c edd.: αἱμορροΐδας cett.

² codd. Ald.: καθάρσεων edd.

³ codd. Ald.: sanguis Guil.: om. Scot. Trap. Gaza: αἷμα
coni. Coraes Sn. Bk. Dt. ⁴ om. E^a L^cpr. Ald. Bk. Dt.

⁵ ἢ L^cpr. m n K^c Ald. Bk. Dt.

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and in the viviparous quadrupeds too.

While the milk comes out the purgations do not occur as a rule, though there have been cases of menstruation while suckling. In general the flow of the moisture does not happen in several places at once, for example women with haemorrhoids have weaker purgations. In some the flow goes through the hips after being secreted from the loins but before reaching the uterus. Further, women whose cleansings fail but who happen to vomit at that time^a are not harmed at all.

It is usual for most babies to be attacked by convulsions, especially those that are better grown and get milk that is more plentiful and thicker and whose wet-nurses are well-fleshed. What does harm, as leading to the condition, is wine (the dark more than the light, and wine taken without water) and most of the wind-producing vegetables,^b and XII

^a See app. crit. Hipp. *aph.* V 32 (IV 542 L) says "when a woman vomits blood, menstruation relieves it", but this is not the same thing. For in *HA* here the point is that discharge of other moisture (e.g. milk 587b30) compensates for the failure of menstruation. Moreover it is unlikely that vomiting of blood would be regarded as either incidental or harmless. The Greek MSS reading may therefore be correct.

^b Apparently the leguminous vegetables, which are believed to promote growth (cf. III 522b32, VII(VIII) 595b6). On the use of wine, cf. Hipp. *sal. vict.* 6 (VI 80 L), where the warning is less strong. *Somn.* 457a14 gives a fuller account and explains that wine may cause harm whether drunk by the infant or by the wet-nurse.

ἐὰν ἡ κοιλία στή. τὰ πλείστα δ' ἀναιρεῖται πρὸ
 τῆς ἐβδόμης· διὸ καὶ τὰ ὀνόματα τότε τίθενται,
 10 ὥς πιστεύοντες ἤδη μᾶλλον τῇ σωτηρίᾳ. καὶ ἐν
 ταῖς πανσελήνοις δὲ μᾶλλον πονοῦσιν. ἐπικίνδυ-
 νον δὲ καὶ ὅσοις τῶν παιδίων οἱ σπασμοὶ ἐκ τοῦ
 νώτου ἄρχονται προιούσης δὴ τῆς ἡλικίας.¹

¹ προιούσης δὴ τῆς ἡλικίας a (exc. δὴ om. G^a Q) γ Ald.: om.
β: *et quando prolongatur* Scot. Alb.: om. Guil. Trap. Gaza
 Cs. edd.: non legit Ott.

HISTORIA ANIMALIUM VIII(IX)

constipation. Most deaths occur before the seventh day, which is why they give them their names then, on the grounds that they have more confidence by then in their survival. The ailment is worse during full moon. And it is dangerous in all babies in which the convulsions start from the back, especially when their age increases.^a

^a The last phrase ("especially . . . increases") is almost identical with the opening phrase of book X. It is given here by the α and γ MSS and Scotus, but omitted by the β MSS and William and Gaza; it is included by the Aldine and earlier editions, but omitted by Camus and all subsequent editors. These words, however, fit reasonably here, but are irrelevant to book X. In the earlier Greek MSS and in Scotus and William, as in this edition, book IX(VII) immediately preceded X, so that the repetition of the final words of IX(VII) in X could be a copyist's error.

- I [προϊούσης δὲ τῆς ἡλικίας] Ἄνδρὶ καὶ γυναικὶ
τοῦ μὴ γεννᾶν ἀλλήλοις συνόντας τὸ αἷτιον ὅτε
μὲν ἐν ἀμφοῖν ἐστὶν ὅτε δ' ἐν θατέρῳ μόνον.
15 πρῶτον μὲν οὖν ἐπὶ τοῦ θήλεος δεῖ θεωρεῖν τὰ
περὶ τὰς ὑστέρας ὅπως ἔχει, ἵν' εἰ μὲν ἐν ταύταις
τὸ αἷτιον αὐται τυγχάνωσι θεραπείας, εἰ δὲ μὴ
ἐν ταύταις περὶ ἕτερόν τι τῶν αἰτίων ποιῶνται
τὴν ἐπιμέλειαν. ἔστι δ' ὥσπερ καὶ περὶ ἄλλο
μέρος φανερόν εἰ ὑγιαίνει ὅταν τὸ ἔργον τὸ
20 αὐτοῦ ἱκανῶς ἀποτελῇ καὶ ἄλυπόν τε ἢ καὶ μετὰ
τὰς ἐργασίας ἄκοπον, οἷον ὀφθαλμὸς ὅταν λήμην
τε μηδεμίαν ποιῇ καὶ ὄρᾳ καὶ μετὰ τὴν ὄρασιν
μὴ ταράττηται μηδ' ἀδυνατῇ ὄραν πάλιν. οὕτω
καὶ ἡ² ὑστέρα ἢ πόνον τε μὴ παρέχουσα, καὶ ὃ
ἐκείνης ἐστὶ τοῦθ' ἱκανῶς ἀπεργαζομένη, καὶ
μετὰ τὰ ἔργα μὴ ἀδύνατος ἀλλ' ἄκοπος.

¹ X librum habent codd. G^a Q F^a X^c, D^a S^c R^c V^c, L^c; et
trs. Scot. Alb. Guil. Trap. Fel.; et edd. Ald. Junt. Bas.
Camot. Scal. Sylb. Sn. Bk. Buss. Pk. Dt. Louis alii

BOOK X^a

[When their age increases]^b The cause of a man and wife's failure to generate when they have intercourse with each other lies sometimes in both, sometimes only in one or the other. Now first one should consider in the female the state of things that concern the uterus, so that it may receive treatment if the cause lies in it, but if the cause does not lie in it attention may be given to another one of the causes. As with any other part, it is evident if it is healthy when it performs its own function satisfactorily and is undistressed and unfatigued after its activities, like an eye when it produces no rheum, and sees, and after seeing is not troubled nor incapacitated from seeing again. So too the uterus that does not cause pain, and satisfactorily fulfils the work that belongs to it, and after its actions is not incapacitated but is unfatigued. It is said too that even if the

^a This book is found as *HA X* in some Greek MSS and Latin versions, but was rejected by Gaza and some later edd. It evidently does not belong to *HA*. See Introd. for discussion of its provenance and purpose.

^b See the last note in IX(VII).

² om. R^c Bk. Dt.

25 λέγεται δὲ καὶ μὴ καλῶς ἔχουσιν τὴν ὑστέραν
 ὁμῶς πρὸς τὸ ἔργον τὸ ἑαυτῆς ἔχειν καλῶς καὶ
 ἀλύπως, ἂν μὴ ταύτης χεῖρον τὸ ἔργον ἐστὶν
 αὐτῆς ἔχειν ὥσπερ ὄμμα κωλύει¹ αὐτὸ δρᾶν ἀκρι-
 βῶς μὴ ἔχοντος τοῦ ὀφθαλμοῦ καλῶς πάντα τὰ
 μόρια ἢ εἰ φῦμά τι ὄν.

30 ὁμοίως δὲ καὶ ὑστέρα, εἰ εὖ ἔχοι² τοῦ ἐπικαίρου
 634a τόπου, οὐθὲν ἂν πρὸς τοῦτο βλάπτοι. δεῖ δὴ τὴν
 ἔχουσιν καλῶς ὑστέραν πρῶτον μὲν τῷ τόπῳ μὴ
 ἐν ἄλλῳ καὶ ἄλλῳ εἶναι ἀλλ' ὁμοίως τῇ θέσει·
 πλὴν γίνεσθαι τὸ πορρώτερον ἄνευ πάθους καὶ
 λύπης, καὶ μηδὲν ἀναισθητοτέρας εἶναι θιγγανο-
 5 μένας. τοῦτο δὲ κρίνειν οὐ χαλεπόν. ὅτι δὲ δεῖ
 τοιαύτας εἶναι ἐκ τῶνδε φανερόν. εἴτε γὰρ μὴ
 πλησίον προσίαισιν, οὐκ ἔσονται ἅμα σπαστικά·

¹ codd. (incl. Q) Guil. (exc. cod. Urb.) Ald. Dt.: οὐδὲν
 κωλύει Scot. Alb. Trap. Fel. Bas. Scal. Sn. Bk. Rud. Louis
 Barnes

² D^a R^c V^c: incert. S^c: ἔχει G^a Q F^a X^c L^c Ald. edd.: *habeat*
 Guil.

^a The correct positioning of the uterus is the next point
 of "good condition". "Similarly" looks back to 633b14 which
 introduced the points of condition (ὅπως ἔχει). For βλάπτειν
 without direct object cf. *EN* 1153a20. πρὸς τοῦτο, lit. "in
 this direction".

^b It was commonly believed that the uterus could

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uterus is not in its right condition, nevertheless for the purpose of its own function its condition is right and undistressed if its function can be obtained from it without being impaired in the way that accurate eyesight is prevented if the eye does not have all its parts in the right condition or if some growth is present.

Similarly too a uterus, if in good condition with regard to its appropriate position, would cause no damage to its function.^a Now the rightly conditioned uterus should, firstly, be not in one place after another^b but constant in position (except that it should attain its farther point without affection^c and pain, and should lose no sensitivity to touch: this is not difficult to judge). That it should be in this state is clear from the following. If it does not come near, it will not have attractive power^d at the

wander about: *Plat. Tim.* 91C, *Hipp. nat. mul.* 44 (VII 388 L). Arist. on the contrary argued that it must be fixed to the front or back of the body (*GA* I 720a12), but this still allowed movement as the following sentences show here. In particular he shared the common view that the uterus descends in preparation for menstruation, for conception, and for birth, but ascends afterwards to its normal position which is the "farther point" mentioned here (cf. IX(VII) 582b24, *GA* II 739a31).

^c *πάθος*, a word much used by Arist. indicating that something additional has 'happened' to a subject, i.e. a condition that is not always present but occurs naturally, and may or may not be morbid (he uses it even of pregnancy at 637a6); see note at VIII(IX) 631b5.

^d So as to draw in the seed.

πόρρω γὰρ αὐταῖς ἔσται ὁ τόπος ὅθεν δεῖ ἀναλα-
 βεῖν. εἰ δὲ μὴ πλησίον μένουσι καὶ μὴ οἶαι ἐπαν-
 ιέναι πορρωτέρω, κωφότεραι ἔσονται· διαθιγγά-
 10 νεσθαι δὲ ἀεί, ὥστε μὴ ταχὺ ἀνοίγεσθαι· δεῖ
 τοῦτο σφόδρα ποιεῖν καὶ εὐηκόους εἶναι. ταῦτά
 τε οὖν χρή ὑπάρχειν, ὅσαις τε μὴ ὑπάρχει αὐται
 θεραπείας δέονται τινος.

καὶ τὰ καταμήνια γίνεσθαι καλῶς, τοῦτο δ'
 ἐστὶ δι' ἴσων χρόνων καὶ μὴ πεπλανημένως,
 ὑγιαίνοντος τοῦ σώματος. σημαίνει γὰρ οὕτω
 15 γινόμενα καλῶς ἔχειν ἀνοίγεσθαι καὶ δέχεσθαι
 τὴν ἐκ τοῦ σώματος ὑγρότητα ὅταν τὸ σῶμα
 διδῷ. ὅταν δὲ πλεονάκης ἢ ἐλαττονάκης ἢ
 πεπλανημένως ἀφιῶσι, τοῦ ἄλλου σώματος μὴ
 συναιτίου ὄντος ἀλλ' ὑγιαίνοντος, ἀνάγκη τοῦτο
 συμβαίνειν δι' αὐτάς. καὶ διὰ κωφότητα οὐκ
 20 ἀνοίγονται δ' ἐν τοῖς καιροῖς, ὥστ' ὀλίγα
 δέχονται· ἢ μᾶλλον ἐπισπῶνται τὸ ὑγρὸν διὰ
 τινὰ φλεγμασίαν αὐτῶν, ὥστε θεραπείας σημαί-
 νουσι δεόμεναι ὥσπερ καὶ ὀφθαλμοὶ καὶ κύστις
 καὶ κοιλία καὶ τᾶλλα· πάντες γὰρ οἱ τόποι
 φλεγμαίνοντες ἔλκουσιν ὑγρότητα τοιαύτην ἢ
 πέφυκεν ἐκκρίνεσθαι εἰς ἕκαστον τόπον, ἀλλ' οὐ
 25 τοιαύτη ἢ τοσαύτη. ὁμοίως δὲ καὶ ἡ ὑστέρα

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time^a; for the place from which it must take up the seed will be far from it. And if it does not remain near, without being apt to go back farther upwards, it will be too insensitive; and contact with it will always be deep, with the result that it does not open quickly: it needs to do this positively and to be responsive. These then are necessary conditions, and any uterus that does not possess them needs particular treatment.

Another condition is that the menses should occur in the right way, that is at proper^b intervals and not irregularly, if the body is healthy. For by so occurring they show that the uterus is in the right state to open and receive the fluid from the body when the body provides it. But when it discharges too frequently or too infrequently or irregularly, while the rest of the body is not a contributory cause but is healthy, it must be due to the uterus. And again it is through insensitivity that it fails to open at the appropriate times, so that it receives little; or it draws in the fluid excessively because of some inflammation within it, and so shows the need of treatment just like eyes and bladder and stomach and the other parts; for all places when inflamed draw fluid of the kind that is naturally secreted into each place, albeit not in such condition or quantity.

^a Simultaneously with coition, cf. 634b34.

^b ἴσων: not 'equal' here but 'just' or 'due', as is shown by 634a16 which distinguishes 'irregular' from both too frequent and too infrequent, i.e. from unreasonable intervals.

πλείω ἀποδιδούσα σημαίνει φλεγματικόν τι
 πάθος, ἐὰν ὅμοια μὲν πλείω δ' ἀποδιδῶ. ἐὰν δὲ
 ὅμοια¹ καὶ σεσημμένα μᾶλλον, οἷα ταῖς ὑγαινου-
 σαις προέρχεται, τοῦτο μὲν ἤδη πάθος καὶ ἐπί-
 δηλον γίνεται· ἀνάγκη γὰρ καὶ πόνους τινὰς
 30 ἐπισημαίνειν ἐχούσης ὥς οὐ δεῖ. ταῖς δ' ὑγαι-
 νούσαις τὰ λευκὰ καὶ σεσημμένα προέρχεται,
 ταῖς μὲν καὶ ἀρχομένων ταῖς δὲ πλείσταις
 ληγόντων τῶν καταμηνίων. ὅσαις μὲν οὖν
 σεσημμένα μᾶλλον γίνεται ἢ ταῖς ὑγαινούσαις ἢ
 ἄτακτα, πλείω ἢ ἐλάττω, μᾶλλον δέονται θερα-
 35 πείας ὥς ἐμποδιζόντων πρὸς τὴν νέωσιν. ὅσαις
 δὲ τοῖς χρόνοις μόνον ἀνωμάλοις καὶ μὴ δι' ἴσου,
 ἦττον μὲν διακωλυτικὸν τὸ πάθος, διασημαίνει
 μέντοι τῆς ὑστέρας τὴν ἕξιν κινουμένην καὶ οὐκ
 ἀεὶ ὁμοίως μένουσαν. ἔστι δὲ τοῦτο τὸ πάθος
 οἷον μὲν βλάψαι τὰς εὐφυεῖς πρὸς τὴν σύλληψιν,
 40 οὐ μέντοι νόσος ἀλλὰ τοιοῦτόν τι πάθος οἷον καθί-

¹ codd. Ald. Guil. (exc. V) Trap. Scal.: ἀνόμοια Guil. (V)
 Junt. Bas. Fel. Camot. Sn. Bk. Dt.

^a Arist.'s immediate point is that if the discharge is like
 that of healthy women but is too putrefied, it indicates a

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Similarly the uterus too, in returning too much fluid, indicates some inflammatory affection, if it returns similar but excessive fluid. And if it is similar^a and excessively putrefied, of the same kind as is discharged in healthy women, this is an affection that is already present and becomes evident: for there are bound to be also certain pains indicating that the uterus is in a state that it should not be in. Healthy women have discharges of the whites in a putrefied state too, some women at the start of the menses but most as they are ceasing. Now those in whom they occur with more putrefaction than in healthy women or are disordered, being too much or too little, tend more to need treatment since these are an impediment to restoration.^b But where it is only the times that are irregular and not at proper intervals, the affection is less obstructive; nevertheless it is a clear indication that the state of the uterus is in movement and is not always in the same condition. This affection is such as to be harmful to conception in women who have a good constitution; it is not, however, a disease but the kind of affection

uterine affection which is bound to show itself through pain. Then at 634a31 he points out that healthy women too have some putrefaction in the discharge at the beginning or end. Then he brings the two points together by saying that (a33) if the discharge is more putrefied than in healthy women, treatment is needed.

^b Either of uterine health or more probably of child-bearing.

634b στασθαι καὶ ἄνευ θεραπείας, ἂν μὴ τι προσεξ-
αμαρτάνῃ αὕτη.¹

ἐὰν δὲ μεταβάλλωσι τῇ τάξει ἢ τῷ πλήθει,
τοῦ ἄλλου σώματος μὴ ὁμοίως ἔχοντος ἄλλ' ὅτε
μὲν ὑγροτέρου ὅτε δὲ ξηροτέρου, οὐθὲν αἷτιαι αἱ
ὑστέραι, ἀλλὰ δεῖ καὶ ἀκολουθεῖν αὐτὰς τῇ τοῦ
5 σώματος ἕξει, δεχομένας καὶ ἀφιείσας κατὰ
λόγον. ἐὰν μὲν οὖν ὑγιαίνοντος τοῦ σώματος
μεταβάλλοντος δὲ τοῦτο ποιῶσιν, οὐθὲν αὐταὶ
δέονται θεραπείας· ἐὰν δὲ νοσοῦντος, ἢ ἐλάττω
ἀποδίδωσι διὰ τὸ ἄλλοθί που ἀναλίσκεσθαι τὸ
περίττωμα, ἢ κάμνει τὸ σῶμα. ἐὰν δὲ πλείω
10 ἀφιῶσι διὰ τὸ δεῦρο ἐξερεύγεσθαι τὸ σῶμα, οὐδὲ
τοῦτο σημαίνει αὐτὰς γε τὰς ὑστέρας δεῖσθαι
θεραπείας ἀλλὰ τὸ σῶμα. ὥς ὅσαις συμμετα-
βάλλει ταῖς ἕξεσι τοῦ σώματος τὰ γυναικεῖα,
δηλοῖ ὅτι οὐθὲν αἷτιον ἐν ταῖς ὑστέραις ἐστὶν ὅτι
ὑγιαίνουσιν διατελοῦσιν. αὐταὶ δ' αὐτῶν ὅτε μὲν
15 ἄρρωστοτέρα ὅτε δὲ ἰσχύουσι μᾶλλον, καὶ ὅτε
μὲν ὑγρότερα ὅτε δὲ ξηρότερα. καὶ φοιτᾷ
αὐταῖς ὅταν μὲν πλείον τὸ σῶμα αὐτοῦ πλείω,
ὅταν δ' ἔλαττον ἐλάττω, καὶ ἐὰν μὲν ὑγρὸν ὑδα-
ρέστερα, ἐὰν δὲ ξηρὸν ἐναιμότερα. καὶ ἄρχονται
μὲν ἐκ λευκῶν γαλακτοειδῶν, ἀνόσμων μενου-

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that may settle down even without treatment unless the woman has something else wrong.

But if they change in regularity or in quantity when the rest of the body is not in a constant state but is sometimes more fluid and sometimes drier, the uterus is in no way the cause but is itself compelled to follow the state of the body, receiving and discharging proportionately. Now if it does this while the body is healthy but changing, it itself needs no treatment; if during sickness, then either the body is rendering too little because the residue^a is being spent in some other direction, or the body is fatigued; and if the uterus emits too much because the body is discharging itself in this direction, this too does not indicate that the uterus itself needs treatment but that the body does. For in women whose menses change with the states of the body, the fact that they remain healthy shows that there is no fault in the uterus. They are sometimes less vigorous than their usual selves but sometimes stronger, and sometimes more fluid but sometimes drier. And the menses come more fully when the body is fuller than usual, less when it is less, and contain more water if it is fluid, more blood if it is dry. And they start from milk-like whites, while the

^a An important concept in Arist.'s physiology, cf. GA II 746b27 and passim (Bonitz, *Index* s.v. *περίττωμα*). In HA I-IX its sense is more often confined to excrements.

¹ codd. Ald.: om. Guil. Fel.: *αὐτῇ* edd.

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20 σῶν· τὰ δὲ φοινικᾷ μέν, ἀπολήγονται δὲ λευκότερα ἐσχάτης καταλήξεως.¹ ὁσμήν δ' ἔχει τὰ λευκὰ ταῦτα οὐ σηπεδόνος ἀλλὰ δριμυτέραν καὶ βαρυτέραν, οὔτε πύου· καὶ ἄνευ μὲν τήξεως, μετὰ μέντοι θερμασίας, ὅταν οὗτος ἦ ὁ τρόπος τῶν σημείων. ὅσαις μὲν οὖν οὕτω συμβαίνει,
25 ταύταις ἔχουσιν ὡς δεῖ τὰ περὶ τὰς ὑστέρας πρὸς τὴν τέκνωσιν.

II καὶ πρῶτον ταῦτα σκεπτέον εἰ καλῶς ἔχει, μετὰ δὲ ταῦτα πῶς ἔχει τὸ στόμα τῶν ὑστερῶν. δεῖ γὰρ εἰς ὀρθὸν ἔχειν· εἰ δὲ μή, οὐχ ἔλξουσιν εἰς αὐτὰς τὸ σπέρμα. εἰς τὸ πρόσθεν γὰρ αὐτῶν καὶ
30 ἡ γυνὴ προίεται, ὡς δῆλον ὅταν ἐξονειρώττωσιν αὐταὶ τελέως· τότε γὰρ οὗτος ὁ τόπος θεραπείας δεῖται αὐταῖς ὑγρανθεῖς ὥσπερ εἰ ἀνδρὶ συνεγίνετο, ὡς προιεμένων ἐνταῦθα καὶ τὸ παρὰ τοῦ ἀνδρός, εἰς τὸν αὐτὸν τόπον καὶ οὐχὶ εἰς τὰς ὑστέρας εἴσω. ἀλλ' ὅταν ἐνταῦθα προιώνται, ἐν-
35 τεῦθεν σπῶσι τῷ πνεύματι, οἶον αἱ ῥῖνες, καὶ αἱ

¹ codd.: καταμήξεως Ald. Camot.: καταμίξεως Bas. edd.: *desinentiae* s. *defluentiae* Guil.: *termini* Trap.: *colliquationis* Fel.: *mistione* Scal.

^a Often used for menses (cf. 635a10, 12, 23, VI 572b33).

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uterus remains odourless; but the menses are red, but whiter when abating during the last stage of cessation. These whites have an odour, not of putrefaction but more acrid and heavy, and not of pus; and there is no decomposition present, though there is heating, when the signs^a occur in this way. Where they take place like this, then, matters concerning the uterus are as they should be for child-bearing.

One should first consider whether those things II
are in the right state, and after them the state of the mouth^b of the uterus. For it should be in a straight line; otherwise the uterus will not draw the seed into itself. For the woman's emission^c too is into the region in front of the uterus, as is evident when they have erotic dreams which reach completion: for then this place requires treatment by them, having become wet as if during intercourse with a man, since the man's emission also comes here, to the same place and not into the uterus within. But when they emit here, the uterus draws the seed

^b "Mouth" and "body" look very alike in some Greek minuscule (cf. VIII(IX) 620b20 note) and have evidently been confused several times in the following pages. Here "mouth" is confirmed by 635a6. The mouth (sometimes 'neck' in Hippocrates) can include cervix as well as os uteri, but not vulva. In *HA* X its precise reference is often unclear; the Latin versions are equally confused. (Cf. Hipp. VIII 14, 20, 318, 438 L.)

^c Throughout this book Arist. argues that the female

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contributes seed to generation, in some sense comparable with the male seed, and that the female seed is conveyed in a fluid which the uterus emits during coition into 'the region in front of the uterus'; there it is mixed with the male emission, and then both are drawn up by wind into the uterus together and are held by the uterus (the taking up and holding of the seed by the uterus is the meaning of "conceive", cf. *LX(VII)* 583b29 note) and become a foetus. This view was widespread, cf. Alcmaeon 24 A 13, Par-

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menides 28 A 54, B 18, Empedocles 31 B 63, Democritus 68 A 142, Hipp. *genit.* 7 (VII 478 L). It opposed the view that only the male contributes seed, cf. Aesch. *Eum.* 658, Eur. *Or.* 553, Anaxagoras 59 A 107, Diog. Apoll. 64 A 27, Plato *Tim.* 50D, 91D. The ancient debate is discussed by E. Lesky, *Die Zeugungs- und Vererbungslehren der Antike*, 1951. In *HA X* Arist. does not further identify the female emission, though he distinguishes it from a moisture which develops during coition like a 'local sweating' 635b17. In *GA* however he says generally that the moisture secreted in coition is local only and is not seed (I 727b36, II 739a20); instead he identifies the female seed with the menses, which he says must be present if a foetus is to develop (II 739a27). The *GA* theory therefore does not radically contradict the *HA X* theory, but refines it. It does not prevent Arist. from calling the menses 'female seed' (*GA* I 725b3, 728a26, 728b22, II 737a28, III 750b4, IV 766b14, *PA* IV 689a12), but he argues that it is less concocted than the male seed and possesses only nutritive soul, so that by itself it can generate no more than wind-eggs (*GA* II 741a24). Equally the statements at *HA* I 489a9-12 (which Vegetti in his note there considers inconsistent with *GA*) and IX(VII) 582a17, implying female seed, are reconcilable with the theory of *GA*. It is odd, on the other hand, that in *GA* Arist. does not refute the opposing view (that the male alone contributes to generation); he mentions it without further argument at I 721a35, IV 763b30. In *GA* his attention is given to current theories of female contribution, all of which he carefully refutes before explaining his own. This suggests that the opposing view (Plato's among others) had already been dealt with; it offers some ground for accepting *HA X* as a genuine work of Arist., prior to *GA* (see *Introd.*).

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ὑστέραι τὸ σπέρμα. διὸ καὶ παντὶ σχήματι συν-
 οὔσαι κύσκονται, ὅτι εἰς τὸ πρόσθεν παντελῶς
 ἐχούσης γίγνεται καὶ αὐταῖς καὶ τοῖς ἀνδράσιν ἢ
 πρόεσις τοῦ σπέρματος· εἰ δ' εἰς αὐτήν, οὐκ ἂν
 πάντως συγγενόμεναι¹ συνελάμβανον. ἐὰν δὲ μὴ
 40 εἰς ὀρθὸν βλέπωσιν αἱ ὑστέραι ἀλλ' ἢ πρὸς τὰ
 ἰσχία ἢ πρὸς τὴν ὀσφύν ἢ πρὸς τὸ ὑπογάστριον,
 635a ἀδύνατον συλλαβεῖν διὰ τὴν προειρημένην
 αἰτίαν, ὅτι ἀνελέσθαι οὐκ ἂν δύναιντο τὸ σπέρμα.
 ἐὰν μὲν οὖν ἰσχυρῶς τῇ φύσει οὕτως ἔχωσιν ἢ
 ὑπὸ νόσου, ἀνίατον τὸ πάθος· ἐὰν δ' ἢ ῥήγμα ἢ
 φύσει ἢ ὑπὸ τῆς νόσου διὰ φλεγμασίαν συσπασά-
 5 σης, ἐπὶ θάτερα αὐτῇ τὸ πάθος.

ταῖς δὲ μελλούσαις ἐγκύοις ἔσεσθαι δεῖ,
 καθάπερ εἴρηται, τὸ στόμα εἰς ὀρθὸν εἶναι, καὶ
 πρὸς τούτοις ἀνοίγεσθαι καλῶς. λέγω δὲ τὸ

¹ D^a R^c V^c Dt.: incert. S^c: συγγινόμεναι G^a Q F^a X^c L^c Ald.
 Bk.

^a The process is explained at 637a15. The wind (pneuma) is atmospheric air that has been drawn into the body; some is always present within the uterus just as it is innately in other parts of the body (cf. IX(VII) 582b27, 584b22, 586a15, X 635b4, PA IV 689a30, GA I 728a10, II 736a1, 736b37). HA X does not offer grounds for any more

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from here by means of wind, like the nostrils.^a Hence too they become pregnant through intercourse in any position, because the emission of the seed both by them and by the men is to the front of the uterus in its correct state, whereas if emission^b were into it they would not conceive irrespective of the method of intercourse. But if the uterus does not point straight,^c but towards the hips or loins or underbelly, it cannot conceive for the cause already stated,^d that it could not take up the seed. Now if this condition is firmly fixed either naturally or through disease, the affection is incurable; but if it is a rupture, either natural or due to disease that causes contraction because of inflammation, the affection tends the other way for the woman.

In those that are going to be pregnant the mouth must, as we have said,^e be in a straight line, and in addition it must open in the right way. By the right

mysterious sense of pneuma. Its only conflict with GA is in this mechanical process of drawing seed into the womb, which GA II 739b9–20 denies: GA attributes the indrawing to heat instead, also denying that the female seed is first emitted into the region outside the uterus and then drawn back inside.

^b The female emission; the two seeds might then fail to mix (cf. 638a22).

^c Displacements of the uterus are often mentioned in the Hippocratic treatises together with remedies: cf. *loc. hom.* 47 (VI 344 L), *nat. mul.* 38 (VII 380), 54 (VII 396), *mul.* I 7 (VIII 32), II 136 (VIII 308).

^d 634b28.

^e 634b27.

- καλῶς τοιοῦτον ὅπως ὅταν ἄρχηται τὰ γυναι-
 κεῖα, θιγγανόμενον ἔσται τὸ στόμα μαλακώτερον
 10 ἢ πρότερον, καὶ μὴ διεστομωμένον φανερώς.
 ἀλλ' εἰ οὕτως ἔχοντος, τὰ πρῶτα σημεῖα τὰ
 λευκὰ φοιτάτω. ὅταν δὲ σαρκινώτερα¹ ἢ τὴν
 χροάν τὰ σημεῖα, φανερώς ἔσται ἀνεστομωμένη
 ἄνευ ἀλγήματος, κἂν θιγγάνῃ κἂν μὴ θιγγάνῃ,
 καὶ μήτε κωφότητα μήτε στόμα ἀλλοιότερον
 αὐτὸ αὐτοῦ. ληξάντων δὲ τῶν γυναικείων
 15 διεστομωμένον ἔστω σφόδρα καὶ ξηρόν, ἀλλὰ μὴ
 σκληρόν, ἡμέραν ὅλην καὶ ἡμίσειαν ἢ καὶ δύο
 ἡμέρας. ταῦτα γὰρ σημαίνει οὕτω γιγνόμενα ὅτι
 καλῶς ἔχουσιν αἱ ὑστέραι καὶ ποιοῦσι τὸ αὐτῶν
 ἔργον, τῷ μὲν μὴ εὐθύς ἀνεστομῶσθαι ἀλλὰ
 μαλακὸν τὸ στόμα γίνεσθαι, ὅτι ἅμα τῷ ἄλλῳ
 20 σῶματι λυομένῳ λύονται, καὶ οὐκ ἐμποδίζουσι,
 καὶ ἀφιασι πρῶτον τὰ ἀπ' αὐτοῦ τοῦ στόματος,
 ὅταν δὲ πλείω τὸ σῶμα, προίενται² ἀναστο-
 μοῦντα·³ ὅπερ ἐστὶ στόματος ὑγιεινῶς ἔχοντος.
 παυσαμένων δὲ τῶν σημείων, τοῦ μὴ εὐθύς συμ-
 πίπτειν σημαίνουσιν ὅτι, ἂν ἀπορήσῃ, κεναὶ καὶ
 25 ξηραὶ γίνονται καὶ διψηραὶ καὶ οὐκ ἔχουσι

¹ D^a V^c Dt.: σαρκικώτερα G^a Q F^a X^c R^c S^c L^c Ald. Bk.

² codd. Ald.: amittat Guil.: demiserit Trap.: mittit Fel.:

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way I mean such that when the menses begin the mouth will be softer to touch than beforehand and not evidently dilated. Now if they begin with the mouth in this condition, the first signs should be the whites. And when the signs are more fleshy in colour, it will be evident that the uterus has opened at the mouth without pain, whether one touches it or not, and that there is neither insensitivity nor any change in the mouth from its usual state. When the menses have ceased the mouth should be wide open and dry, but not hard, for a whole day and a half or even two days. For by happening in this way these things show that the uterus is in the right state and is performing the function that belongs to it—that on the one hand, in so far as the mouth is not open immediately but is becoming soft, the uterus is relaxing at the same time as the rest of the body relaxes, and is not obstructing, and is discharging first what comes from the mouth itself; and on the other hand when the body emits more, the uterus emits it by opening up: all of which is characteristic of a mouth in healthy condition. And when the signs have ceased, the fact that it does not immediately close is a sign, in case of doubt, that the uterus is becoming empty and dry and thirsty and

πποληται coni. Sylb.: *πποληται coni.* Sn. Bk. Dt.

³ codd. Ald.: *aperientia* Guil. Trap.: *ἀναστομούνται coni.*
Sylb. edd.: *expanduntur* Fel.

λείψανα περὶ τὴν δίοδον. προσπαστικάι οὖν
οὔσαι σημαίνουσι καλῶς ἔχειν πρὸς τὸ συλλαβεῖν
πλησιάσαντος ὅταν οὕτως ἔχωσιν ἄνευ ἄλγους
καὶ μετὰ ἀναισθησίας. τό τε μὴ ἀλλοιότερον
ἔχειν τὸ στόμα¹ ἀγαθόν· καὶ γὰρ τοῦτο σημαίνει
30 ὅτι οὐδέν ἐστιν ὃ κωλύει μὴ συμμύειν αὐτὰς ὅταν
δέη.

III περὶ μὲν οὖν τὸ στόμα τῶν ὑστερῶν ἐκ τούτων
ἡ σκέψις ἐστὶν εἰ ἔχει ὥς δεῖ ἢ μὴ. περὶ αὐτὴν
δὲ τὴν ὑστέραν δεῖ συμβαίνειν τοιαῦτα μετὰ τὴν
κάθαρσιν, πρῶτον μὲν ἐν τοῖς ὕπνοις ὥς συγγινο-
35 μένην τῷ ἀνδρὶ καὶ προιεμένην, ὥς ἂν εἰ παρε-
πλησιάζε, ῥαδίως· ἂν τοῦτο φαίνεται πλεονάκεις
πάσχουσα, ἄμεινον. καὶ ἀνισταμένην ὅτε μὲν
δεῖσθαι θεραπείας οἷας ὅταν πλησιάσῃ ἀνδρί, ὅτε
δὲ ξηρασίας· τὴν δὲ ξηρότητα ταύτην μὴ συν-
εχῇ, ἀλλ' ὕστερον μετὰ τὴν ἔγερσιν ἐξυγραί-
νεσθαι ὅτε μὲν θάπτων ὅτε δ' ὀψιμαίτερον καὶ ὅσον
40 εἰς ἡμισυ τῆς ἡμέρας βραχείας προελθούσης. ἢ
635b δ' ὑγρότης ἔστω τοιαύτη οἷα ὅταν πλησιάσῃ τῷ
ἀνδρὶ. πάντα γὰρ ταῦτα σημαίνει δεκτικὴν τὴν
ὑστέραν εἶναι τοῦ διδομένου, καὶ προσπαστικάς²

¹ F^apr. Guil. Trap. Fel. Sn. Dt.: σώμα cett. Ald. Bas.
Scal. Bk.: om. Scot. Alb.

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has nothing left around the passageway. And so it shows that, being capable of attracting, it is in the right state to conceive after intercourse when it is in this state without pain and with lack of sensation. And to have no change in the mouth is good; for this shows that there is nothing preventing the uterus from closing when it should.

Concerning the mouth of the uterus, then, those are the grounds from which to consider whether it is in the required state or not. But concerning the uterus itself, after the purgation^a there should be circumstances of the following sort: first, that the woman in her sleep, thinking that she is having intercourse with her husband, should actually emit as if during coition, with ease; if it is evident that she experiences this often, it is better. And on rising she should sometimes have treatment such as follows intercourse with a man, sometimes have a dry state; but this dryness should not be continued, but later after waking there should be a moistening, sometimes sooner and sometimes later even up to half the day when the current day is short. And the moisture should be such as follows intercourse with the husband. For these are all signs that the uterus is receptive of what is presented to it, and that the

III

^a *κάθαρσις*, the normal word for menstruation.

² codd. Ald.: *προσπαστικὰς* edd.: *attractivos* Guil.: cf. 635a25

τὰς κοτυληδόνας καὶ καθεκτικὰς ὧν λαμβάνουσι
καὶ ἀκούσας ἀφείσας.

- 5 ἔτι φύσας ἐγγίγνεσθαι ἄνευ πάθους, ὥσπερ ἡ
κοιλία, καὶ ἀφίεναι, καὶ μεγάλας γινομένας καὶ
ἐλάττους αὐτῶν, ἄνευ νόσου· καὶ γὰρ ταῦτ' ἀπο-
δηλοῖ αὐτὰς ὅτι οὐδὲν στερεώτεραι τοῦ δέοντός
εἰσιν, οὔτε κωφαὶ οὔτε φύσει οὔτε νόσω, ἀλλὰ
δύνανται, ὥς ἂν δέξωνται, αὐξανομένῳ παρέχειν
10 χώραν. ἔχουσι δὲ καὶ διάτασιν. ὅταν δὲ τοῦτο
μὴ γίγνηται, ἢ πυκνότεραί εἰσιν ἢ ἀναισθητό-
τεραι ἢ φύσει ἢ νόσω. διὸ καὶ οὐ δύνανται τρέ-
φειν ἀλλὰ καὶ διαφθείρουσι τὰ ἔμβρυα, ἐὰν μὲν
σφόδρα τοιαῦται ὥσιν ἔτι μικρὰ ὄντα, ἐὰν δ'
ἤττον μείζω· ἐὰν δὲ πάνυ ἥρεμα, φαυλότερα,
ἐκτρέφουσι δὲ¹ τὰ ἔκγονα καὶ οἷον ἐν ἀγγείῳ
15 φαύλῳ τραφέντα.

ἔτι δὲ θιγγανομένης τὰ ἐπὶ δεξιὰ καὶ τὰ ἐπ'
ἀριστερὰ ὁμαλὰ αὐτῆς εἶναι, καὶ τὰλλα τούτοις
ὁμοίως. καὶ ἐν τῇ πρὸς τὸν ἄνδρα συνουσίᾳ
μεταξὺ ὑγραίνεσθαι, μὴ πολλάκις δὲ μηδὲ

¹ δὲ secl. Sn. Bk. Dt.

^a Cotyledons: cf. IX(VII) 586b10 note. Their role as suckers is shown here (the same word is used for the

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cotyledons^a are able to attract and able to hold what they take and unwilling to let go.

Further, flatulences should develop in the uterus without an affection, just as the stomach has, and it should discharge them, both when they become large and the smaller ones, without illness; for all this shows that it is no firmer than it should be, nor insensitive either by nature or by disease, but is able, according as it may receive,^b to provide room for growth. It is also able to stretch. But when this does not happen, it is either too dense or too insensitive by nature or disease. Hence too it is unable to nourish the embryos but actually destroys them while they are still small, if it is seriously affected in this way, or when they are bigger if it is less so; and if it is quite mildly affected, the offspring are inferior but it completes their nourishing although they are as if nourished in a poor container.

Further, its right and left sides should be even^c to the touch, and its other parts likewise. And during intercourse with the husband it should become moist at one stage, but not repeatedly nor exces-

suckers on the octopus's tentacles *PA* IV 685b3, *HA* IV 524a2, *V* 541b7).

^b That is, whether the seed that it receives will produce a large or small foetus, single or multiple.

^c Not soft or smooth but regular; on the contrary smoothness prevents conception *IX(VII)* 583a16. "Right and left": when compared with each other; "other parts" should be generally even too.

- σφόδρα. ἔστι δὲ τοῦτο τὸ πάθος οἷον ἰδρωμα τοῦ
τόπου, ὥσπερ καὶ τῷ στόματι σιάλου πολλαχού
20 μὲν καὶ πρὸς τὴν φορὰν τῶν σιτίων, καὶ ὅταν
λαλῶμεν καὶ ἐργαζώμεθα αὐτοὶ πλέον· καὶ τοῖς
ὄμμασι δακρύομεν πρὸς τὰ λαμπρότερα ὀρῶντες,
καὶ ὑπὸ ψύχους καὶ θερμότητος ἰσχυροτέρας, ἥς
κρατεῖ τὰ μόρια ταῦτα ὅταν τύχῃ ὑγροτέρως
ἔχοντα. οὕτω καὶ αἱ ὑστέραι ὑγραίνονται ἐργα-
25 ζόμεναι, ὅταν τύχῃσιν ὑγροτέρας διαθέσεως.
πάσχουσι δὲ τοῦτο τὸ πάθος καὶ αἱ μάλιστα
καλῶς πεφυκυῖαι. διὸ θεραπείας αἰεὶ δέονται αἱ
γυναῖκες ἢ πλείονος ἢ ἐλάττονος, ὥσπερ καὶ τὸ
στόμα πτύσεως. ἀλλ' ἐνίαις τοσαύτῃ ὑγρασία
γίνεται ὥστε μὴ δύνασθαι καθαρὸν τὸ τοῦ ἀνδρὸς
30 ἀνασπάσαι διὰ τὴν σύμμειξιν τῆς γιγνομένης ἀπὸ
τῆς γυναικὸς ὑγρότητος.

- πρὸς δὲ τούτοις τοῖς πάθεσι καὶ τοσόνδε δεῖ
κατανοεῖν εἰ συμβαίνει, ὅταν δόξῃ ἐν τῷ ὕπνῳ
πλησιάζειν τῷ ἀνδρί· πῶς ἔχουσα ἐξανίσταται,
οἷον εἰ ἀσθενεστέρα, καὶ εἰ αἰεὶ, μὴ ὅτε μὲν ὅτε δ'
35 οὐ, ἢ ἐνίοτε καὶ ἰσχυροτέρα· εἰ δὲ μὴ ξηροτέρα
τὸ πρῶτον, εἶτα ἐφυγραίνεται. δεῖ γὰρ ταῦτα
συμβαίνειν τῇ γονίμῳ γυναικί. τὸ μὲν γὰρ ἐκ-
λύεσθαι σημαίνει προετικὸν εἶναι τὸ σῶμα σπέρ-

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sively. This affection is like a local sweating, as of saliva which is often produced in the mouth at the serving of food and when we talk and work more than usual; and our eyes weep when we look at things that are too bright, and when we experience severe cold and heat, which these parts overcome when they have got into a moister state. So too the uterus becomes moist through working, when it has got into a moister disposition. This affection is experienced by even the most correctly constituted uterus. Hence the women always need treatment to a greater or lesser degree, just as the mouth needs to spit. But in some so much moisture develops that they cannot draw up the man's emission in a pure state because of the admixture of the fluid coming from the woman.

In addition to these affections one should also ascertain whether so much as the following occurs after she has seemed in sleep to have had intercourse with her husband: in what state does she arise, for example whether weaker, and whether always so (not sometimes weaker and sometimes not) or whether sometimes even stronger; and whether she fails to be drier at first and to become moist afterwards. For these things should happen to the fertile woman. For the relaxing shows that the body is emissive of seed every time, and it acts

ματος αεί, τήν τε ποιούσαν ποιεί· καὶ σωματωδῶν
 δ' οὐσῶν ἀσθενέστερα.¹ τὸ δ' ἀνόσως τοῦτο
 40 πάσχειν σημεῖον ὅτι κατὰ φύσιν καὶ ὃν δεῖ τρόπον
 ἢ ἀφοδος τούτου γίνεται· εἰ γὰρ μή, νοσώδης ἦν²
 636a ἀρρωστία. τὸ δέ ποτε καὶ ἰσχύειν μᾶλλον, καὶ
 ξηρὰν εἶναι τήν ὑστέρα, εἴτ' ἐφυγραίνεσθαι,
 σημεῖον ὅτι πᾶν τὸ σῶμα λαμβάνει καὶ ἀφανίζει,
 καὶ οὐ μόνον ἡ ὑστέρα, καὶ τὸ σῶμα ἰσχύει. πνεύ-
 5 ματί τε γὰρ ἔλκει ἡ ὑστέρα τὸ προσελθὼν ἔξωθεν
 αὐτῇ, ὥσπερ πρότερον εἴρηται. οὐ γὰρ εἰς αὐτὴν
 προίεται, ἀλλ' οὗ καὶ ὁ ἀνὴρ. ὅσα δὲ πνεύματι,
 πάντα ἰσχύϊ ἐργάζεται. ὥστε δῆλον ὅτι καὶ τὸ
 σῶμα προσπαστικὸν³ τὸ⁴ τῆς τοιαύτης.

εἰσὶ δέ τινες αἱ πάσχουσί τι τοιοῦτον ὃ καλοῦσιν

¹ cett. Ald. Bas.: ἀσθενεστέρα Bk.

² post ἦν add. ἡ G^a Q F^a X^c L^c Ald. edd.: incert. S^c: om. Scot.: *langorosa erat infirmitas* Guil.

³ προσπαστικὸν edd.

⁴ codd. Ald. Bas.: *quod talis* Guil.: om. Bk. Dt.

^a The agent is the person, who performs the action through her body; the body's emission of seed weakens it, causing her relaxation. Comparable verbal jingles occur at 635a20, 635b25, 636a25, 638b16, 18.

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upon the agent^a; and if they have much body,^b their bodies become still weaker. But the fact that they experience this without being ill is evidence that this discharge takes place in accordance with nature and in the way that it should; for otherwise it was a morbid loss of strength. And the fact that they sometimes even gain strength, and that the uterus is dry and then becomes moist, is evidence that the whole body is receiving something and disposing of it, not only the uterus, and that the body has strength. For it is not only the uterus that draws in by means of wind that which comes to it from outside, as we have said previously^c (for the emission is not into it, but where^d the man too emits); and whatever works by wind works by strength.^e So it is clear that the body too of such a woman is engaged in drawing in.^f

There are some women who have the follow-

^b Some edd. mark this passage as corrupt, but the sense is good and the style is crisp: the more corpulent the women are, the greater the effect.

^c 634b34; further explained at 637a15.

^d On 636a6 see Additional Notes.

^e For internal wind (pneuma) as a source of strength cf. IX(VII) 587a4, *Somno* 456a16, GA II.738a1.

^f The point of this seems to be that the body is drawing in an emission although no male seed is present: it is the female uterine emission that is benefiting the body.

- 10 ἐξανεμοῦσθαι· δεῖ δὴ καὶ τοῦτο μὴ πάσχειν. ἔστι
 δὲ τὸ τοιοῦτον πάθος. ὅταν συγγένωνται τῷ
 ἀνδρί, οὔτε προιέμεναι δῆλαι τὸ σπέρμα οὔτε κυί-
 σκονται, διὸ καὶ καλεῖται ἐξανεμοῦσθαι. αἴτιον
 δὲ τοῦ πάθους ἢ ὑστέρα, ὅταν ᾗ λίαν ξηρά. ἐλ-
 κύσασα γὰρ πρὸς αὐτὴν τὸ ὑγρὸν ἀφήσιν ἔξω·
 15 τὸ δὲ κατασκελετεύεται, καὶ μικρὸν τι γινόμενον
 ἐξ αὐτοῦ ἀπέπεσέ τε καὶ ἔλαθε διὰ μικρότητα
 ἐξιόν. καὶ ὅταν μὲν τοῦτο σφόδρα πάθῃ ἢ ὑστέρα
 καὶ γένηται ὑπέρξηρος, ταχύ τε ἀπέβαλε καὶ
 ταχὺ δῆλον γίνεται ὅτι οὐ κύει· ἐὰν δὲ μὴ
 σφόδρα ταχέως ταῦτα ποιῇ, ἐν τῷ μεταξὺ χρόνῳ
 20 δοκεῖ κύειν ὃ ἂν ἔχῃ αὐτὴ πρὸς αὐτὴν, ἕως ἂν
 ἀποβάλῃ. καὶ ὅμοια συμβαίνει ταχὺ ταύταις
 πάθῃ οἷα ταῖς ὀρθῶς κυοῦσαις, καὶ ἐὰν γίγνηται
 πολλὸς χρόνος, αἶρεται ἢ ὑστέρα ὥστε φανερώς
 δοκεῖ κύειν, ἕως ἂν ἀποπέσῃ· τότε δὲ ὁμοίᾳ
 ἐγένετο οἷα πρὸ τοῦ ᾗν. ἀναφέρουσι δὲ τοῦτο τὸ
 25 πάθος εἰς τὸ δαιμόνιον· ὃ ἔστι θεραπευτὸν ἐὰν
 μὴ φύσει τοιαύτῃ ᾗ σφόδρα πάσχουσα τὸ πάσχον.

^a False pregnancy was popularly attributed to "wind", but without explanation; so "wind-eggs", ὑπηνέμια. At 572a13 Arist. uses ἐξανεμοῦσθαι of mares which become excited by the wind and eventually expel the hippomanes

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ing kind of experience which they call wind-pregnancy^a; and this indeed they should not have. The affection is as follows. After intercourse with the husband they neither give evidence of emitting the seed nor do they become pregnant, hence it is actually called wind-pregnancy. The cause of the affection is the uterus, when it is too dry. For after drawing the fluid to itself it lets it go outside; the fluid withers away, and becoming a small thing from what it was it falls out, and its departure is unnoticed because of its smallness. Now when the uterus is severely affected in this way and has become excessively dry, it expels it soon, and it soon becomes clear that it is not pregnant. But if it does not do this very soon, it seems in the meantime to be pregnant with whatever it is holding to itself, until it has expelled it. And these women soon experience affections like those of normal pregnancies, and if much time passes the uterus is raised so that it seems evidently pregnant, until the expulsion; then it becomes like what it was before. They attribute this affection to the supernatural; but in fact it can be treated unless the uterus is naturally like this, very subject to the affection.^b It is a sign that they

from the genital parts. (In popular belief they could be really impregnated by the climatic wind: see Peck's note at V 541a31.)

^b τὸ πάσχον stands for τὸ πάθος: cf. Soph. *Trach.* 196 τὸ ποθοῦν, Hipp. *mul.* II 128 (VIII 274 L) τοῦ μεμαθηκότος. For other verbal jingles cf. 635b38 note.

σημεῖον δὲ τοῦ μὴ τοιαύτας εἶναι ἔαν φαίνωνται
μὴ προϊέμεναι, ὅταν λάβωσι παρὰ τοῦ ἀνδρός,
καὶ μὴ συλλάβωσιν.

- IV κωλύονται δὲ καὶ ἔαν σπάσμα ἔχωσιν αἱ
ὑστέραι. γίνονται δὲ σπάσματα ἐν ταῖς ὑστέραις
30 ἢ φλεγμασίᾳ διατεινομένης τῆς ὑστέρας, ἢ ἐν τῷ
τόκῳ πληρώματος πολλοῦ ἑξαπίνης ἐπιπεσόντος
καὶ μὴ ἀνοιγομένου τοῦ στόματος· τότε ὑπὸ τῆς
διατάσεως γίνεται σπάσμα. σημεῖον δὲ τοῦ μὴ
ἔχειν σπάσμα ἔαν μὴ φαίνεται εἰς φλεγμασίαν
ἀφικνουμένη ἐν τοῖς αὐτοῖς¹ ἔργοις ἢ ὑστέρα·
35 ἔχουσα γὰρ σπάσμα φλεγμαῖνοι ἂν ποτε. ἔτι δὲ
ἔαν φῦμα ἐπὶ τοῦ στόματος ἢ πολλὰ ἐλκωθέντος,
ἐμποδίζει πρὸς τὰς συλλήψεις. σημεῖον δὲ καὶ
τοῦ ταῦτα μὴ ἔχειν ἔαν φαίνεται ἀνοιγομένη
καλῶς ἢ ὑστέρα καὶ συμμύουσα ὅταν γένηται
αὐταῖς τὰ γυναικεία καὶ αἱ πρὸς τὸν ἄνδρα χρή-
636b σεις. ἔτι ἔστιν αἷς πῶς τὸ στόμα συμφύεται,
ταῖς μὲν ἐκ γενετῆς ταῖς δὲ διὰ νόσον. γίνεται

¹ codd. Ald.: *opus suum* Scot. Alb.: *in propriis operibus*
Guil.: *suis* Trap. Fel.: *αὐτῆς* coni. Scal. edd.

^a The argument is: if the uterus fails to emit seed when
receiving a male emission, but then takes something in, it

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are not like this if they show evidence of failing to emit, after receiving from the husband, and if they do not conceive.^a

Another impediment is spasm in the uterus. IV
Spasms develop in the uterus either when the uterus is being distended by inflammation or during childbirth when large contents have pressed down suddenly and the mouth does not open; then spasm is caused by the distention. It is a sign that it does not have spasm if the uterus, during the same actions, is not observed to develop inflammation; for if it had spasm it would be inflamed at some time. Further, if there is a growth on the mouth, and the mouth has been much affected by sores, this is an obstacle to conception. It is a sign that it does not have these if the uterus is observed to open and close in the right way when they have the menses and when they have intercourse with the husband. Further, there are cases where the mouth is in some way grown together, in some from birth and in others through disease. There are both curable

forms a wind-pregnancy (636a11); if on the other hand it fails to emit when receiving, and does not take anything in, it is not liable to wind-pregnancy. "Conceive" at 636a28 as usual means "take and hold in the uterus", not necessarily become pregnant with a live foetus (cf. IX(VII) 583b29). So at 636a19 in wind-pregnancy the womb appears to be pregnant with "whatever it is holding". At a26 *τοιαύτας* picks up a25 *τοιαύτη*; a sign that the womb is not "like this" (i.e. severely prone to wind-pregnancy) is that after failure to emit in coition the womb does not take anything into itself.

δὲ τοῦτο καὶ ἱατὸν καὶ ἀνίατον. οὐ χαλεπὸν δὲ
 τοῦτο γινῶναι ἐὰν ᾗ· οὐ γὰρ οἶόν τε οὔτε λαμβά-
 νειν οὐδὲν ὦν δεῖ οὔτε προίεσθαι. ἐὰν οὖν φαίνη-
 5 ται καὶ δεχομένη παρὰ τοῦ ἀνδρὸς καὶ ἀφιεῖσα,
 δῆλον ὅτι καὶ ἔλεγχος εἴη τῷ πάθει.

ὅσαις δὲ τούτων μηδὲν ἐμπόδιον ᾗ ἀλλ'
 ἔχουσιν ὃν τρόπον δὴ εἴρηται ἔχειν, ἂν μὴ ὁ ἀνὴρ
 αἷτιος ᾗ τῆς ἀτεκνίας ἢ ἀμφοτέροι μὲν δύνωνται
 τεκνοῦσθαι πρὸς ἀλλήλους δὲ μὴ ὥσι σύμμετροι
 10 τῷ ἅμα προίεσθαι ἀλλὰ πολὺ διαφωνῶσιν,¹ ἔσον-
 ται τέκνα τούτοις.

V τῷ² μὲν³ εἰδέναι⁴ τὰ τοῦ ἀνδρὸς αἷτια ἔστι μὲν
 καὶ ἄλλα σημεῖα λαβεῖν· ἃ δὲ ῥάω μάλιστα,⁵
 φαίνοιτο πρὸς ἄλλας πλησιάζων καὶ γεννῶν.
 τοῦ⁶ δὲ πρὸς ἄλλους⁷ μὴ συνδρόμως ἔχειν,
 πάντων τῶν εἰρημένων ὑπαρξάντων, οὐ γεννῶ-
 15 σιν. δηλοῖ γὰρ ὅτι τοῦτο αἷτιον μόνον. εἴπερ

¹ post διαφων. add. οὐκ codd. Ald. Guil. Trap. Fel.: om. Scot. Alb.: secl. Bk. Dt.

² τῷ D^a R^c V^c: τοῦ G^a Q F^a X^c S^c L^c Ald. edd.: *ad sciendum* Guil. Trap.

³ μὲν οὖν G^a Q F^a X^c S^c L^c Ald. edd.: *et* Scot.: *autem* Alb. Guil.: *vero* Trap.

⁴ εἶναι coni. Bk.

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and incurable instances of this. It is not difficult to recognise it if it is present; for the uterus can neither take nor emit what it should. Therefore if it evidently both receives from the husband and discharges, clearly this must disprove the affection.

But where none of these impediments is present but the uterus is in the state that we have described, if it is not the case that the husband is the cause of the childlessness or that both are able to have children but are not matched to each other in simultaneous emission but are very discordant, they will have children.^a

In knowing the causes on the husband's side V there are various signs to be taken; but taking those that are mostly easier, let him be observed to have intercourse with other women and to generate. But failure to keep pace with others^b brings failure to generate, even though all the above-mentioned conditions have been present. For it is plain that this

^a On 636b10 see Additional Notes.

^b The need for simultaneous emission was also a Hippocratic view (*mul.* I 17, VIII 56 L).

⁵ post μάλιστα add. ἀν coni. Sn. Bk.: add. ἐὶ coni. Pk. Rud.: *magis uidebuntur* Guil.

⁶ D^a R^c V^c Dt.: τὸ G^a Q F^a X^c S^c L^c Ald. Bk.: τῷ coni. Louis

⁷ D^a R^c V^c: ἄλλας G^a Q F^a X^c L^c Ald.: incert. S^c: *ad invicem* Guil.: ἀλλήλους coni. Sn. Bk. Dt. Louis

γὰρ καὶ ἡ γυνὴ συμβάλλεται εἰς τὸ σπέρμα καὶ
 τὴν γένεσιν, δηλὸν ὅτι δεῖ ἰσοδρομῆσαι παρ'
 ἄμφοιν. ἔαν οὖν ὁ μὲν ταχὺ ἐκποιήσῃ ἡ δὲ μόλις
 (τὰ γὰρ πολλὰ αἱ γυναῖκες βραδύτεραι), τοῦτο
 κωλύει. διὸ καὶ συζευγνύμενοι γεννῶσι μετ'
 20 ἀλλήλων οὐ γεννῶντες δὲ ὅταν ἐντύχωσιν ἰσο-
 δρομοῦσι πρὸς τὴν συνουσίαν. εἰ γὰρ ἡ μὲν
 ὀργῶσα καὶ παρεσκευασμένη εἴῃ καὶ ἐννοίας
 ἔχουσα ἐπιτηδείας, ὁ δὲ προλελυπημένος καὶ
 κατεψυγμένος, ἀνάγκη τότε ἰσοδρομῆσαι αὐτοὺς
 ἀλλήλοις.

ὅτι¹ δ' ἐνίοτε γυναιξὶ καὶ ἐξονειρωξάσαις καὶ
 25 ἀνδράσιν ἀφροδισιάσαις συμβαίνει εὐρωστοτέροις
 εἶναι, μὴ ἰσχύει ἀλλ' ὑγίεια· γίνεται δὲ τοῦτο
 ὅταν πολὺ τὸ σπέρμα ἢ ἡθροισμένον ἐπὶ τὸν
 τόπον ὅθεν προέονται. ἔαν οὖν τότε ἀπέλθῃ,
 οὐδὲν ἀσθενέστεραι γίνονται· οὐ γὰρ αἰεὶ ἐκλύον-
 ται ἀπελθόντων, ὅταν ἱκανὰ ἢ τὰ λειπόμενα,
 30 οὐδ' ἂν εἰ ἐκεῖνα ἄχρηστα ἢ· ἅμα καὶ ῥᾶον,² οἷον

¹ codd. Ald.: *quod* Guil. Trap.: *iam vero* Fel.: ἔτι coni. Scal. edd.

² D^a R^c V^c Dt.: ῥᾶω G^a Q F^a X^c S^c L^c Ald. Bk.: *facile* Guil.

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alone is the cause. For if it is true that the wife too contributes to the seed and the generation, plainly there is need of equal speed on both sides. Therefore if he has completed quickly while she has hardly done so (for in most things women are slower), this is an impediment. This is also why they generate when united with each other but fail to generate in encounters with partners who go with the same speed towards intercourse.^a For if the woman is excited and prepared and has thoughts that are appropriate, while the man is preoccupied with troubles and has become cool, then the result must be equal pace with each other.

With regard to the fact that sometimes women after emissions in dreams and men after sexual intercourse are as a result more vigorous, not in strength but in health: this happens when the seed has accumulated in large quantity at the place from which they emit it. If it is then discharged, therefore, women are not weakened at all; for they are not always relaxed after the discharge, when what remains is enough—not even if what remains is useless; at the same time it is easier, as when things

^a The argument distinguishes between equal pace in preparation for coition (636b20) and equal pace of emission (636b23). The intervening lines 636b21–23 explain why *unequal* pace in preparation makes for *equal* pace of emission.

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πλησμονῆς ἀπαλλαγέντα· διὸ οὐκ ἰσχύϊ εὐρω-
 στότεραι ἀλλὰ κουφότητι γίνονται. ἀλλ' ὅταν
 ἀπὸ τοσούτων ἐπὶ ὧν τὸ σῶμα δεῖται, τότε
 ἀσθενεστέρας ποιεῖ. παύεται δὲ ταχὺ ἢ ἄλλως
 35 τις ὑγιάνῃ τὸ σῶμα καὶ ἐν ἡλικίᾳ ἥ¹ ταχὺ σπερ-
 μοποιεῖ· τῶν γὰρ αὐξανομένων τοῦτ' ἐστὶ ταχὺ
 καὶ τῶν αὐξητῶν. καὶ λανθάνουσι τότε μάλιστα
 κυσκόμεναι. οὐ γὰρ οἴονται συνειληφέναι ἔαν μὴ
 αἰσθωνται (προιέμεναι δὲ τυγχάνουσιν), ὑπολαμ-
 βάνουσai ὡς δεῖ ἐπ'² ἀμφοῖν συμπεσεῖν ἅμα, καὶ
 ἀπὸ τῆς γυναικὸς καὶ ἀπὸ τοῦ ἀνδρός.

637a μάλιστα δὲ λανθάνει ὅσαι οἴονται ἀδύνατον
 εἶναι συλλαβεῖν ἔαν μὴ ξηρανθῶσι καὶ ἐπιδήλως

¹ codd.: ἥ Ald. Fel.: *fuert quae* Guil.: ἥ ἥ Bk. Dt.

² codd. Ald.: *in s. ab* Guil.: ἀπ' coni. Scal. edd.

^a Cf. GA I 725a3–11, b5–18. Fertile seed comes from the useful residues of nutrition in the blood, and to lose it may cause weakness; however, it is sometimes accompanied by useless residues, and if there is an excess of seed it may be a relief to be rid of it even if what remains is not useful and strengthening.

^b Some edd. have transposed a section starting here: see note to 636a6 in Additional Notes.

^c It has not reached a limit of growth like bones and other parts.

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are freed from over-fulness.^a Hence their increased vigour is due not to strength but to lightness. But when the emission comes out of the amount that the body needs, then it makes women weaker. But it soon ceases to do so^b if a person is otherwise healthy in body and at an age which produces seed quickly; for seed is one of the things that are quickly increased and are capable of increase.^c And it is chiefly then that they fail to notice that they are becoming pregnant. For they do not think they have conceived if they had no sensation^d (though in fact they do emit), believing that the emissions should fall together simultaneously in the case of both partners, coming from both the woman and the man.

But^e it is most deceptive to those who think it is impossible to have conceived unless they have become dry^f and unless the man's contribution has

^d Of emission or weakness or relief.

^a 636b39-637a9 is repeated at the end of the book in the Greek MSS and Ald., also in Scot. Guil. (but not in the Vat. 2095 version of Guil.). It is not repeated by Trap. Scal. Fel. nor by Bas. 1550. Though there are a few minor variations (see app. crit.) between the two passages, the later passage obviously does not fit its context and must be a doublet added mistakenly at an early stage of transmission.

^f For dryness as evidence of conception cf. 635a37, b35, 636a1, 637a20; IX(VII) 583a14; GA II 739b4; Hipp. *steril.* 220 (VIII 424 L).

ἀφανισθῇ τὸ δοθέν. συμβαίνει δ' ἐνίοτε πλεόν
 προίεσθαι καὶ αὐτὴν καὶ τὸν ἄνδρα οὗ ἂν
 δύναιτο¹ ἀφανίσει καὶ τοῦ ἱκανοῦ. ὅταν οὖν
 σπάσῃ μὲν ἱκανόν, ληφθῇ² δὲ πολὺ, τότε λανθά-
 5 νουσι κυισκόμεναι. ὅτι δὲ τοιοῦτον ἐνδέχεται
 γίνεσθαι καὶ οὐκ ἐξ ἅπαντος γίνεται τὸ πάθος,
 δηλοῖ ὅσα τῶν ζώων ἀπὸ μιᾶς ὀχείας πολλὰ
 τίκτει, καὶ ἡ τῶν διδύμων γένεσις, ὅταν ἀπὸ
 μιᾶς γένηται. δῆλον γὰρ ὅτι ἐξ οὐχ ἅπαντος
 ἐγένετο, ἀλλὰ μέρος τι αὐτοῦ ἔλαβέ τις³ τόπος,
 10 τὸ δὲ περιέλιπε⁴ πολλαπλάσιον. ἔτι εἰ πολλὰ
 ἀπὸ μιᾶς ὀχείας γίνεται, ὅπερ φαίνεται ἐπὶ τῶν
 ὑῶν καὶ τῶν διδύμων ἐνίοτε γιγνόμενον, δῆλον
 ὅτι οὐκ ἀπὸ παντὸς ἔρχεται τὸ σπέρμα τοῦ
 σώματος, ἀλλ' ἐφ' ἐκάστου εἵδους ἐμερίζετο.
 ἀπὸ παντὸς μὲν γὰρ ἐνδέχεται ἀποχωρισθῆναι
 15 καὶ τὸ πᾶν εἰς πολλὰ. ὥστε ἅμα καὶ κατὰ μέρος

¹ δύνηται infra codd. Ald., hic etiam coni. edd.

² ληφθῇ hic et infra codd. Ald.: *remanebit hic, remanet* infra Scot.: *relinquatur utrobique* Guil.: *relictum sit* Trap.: *relicta fuerit* Fel.: *λειφθῇ* coni. Scal. edd.

³ τις hic et infra cett. Guil. Sn.: incert. hic, habet infra S^c: om. hic, habet infra L^c Ald.: om. Bk.: δ coni. Dt.

⁴ περιέλιπε hic codd. Ald.: *περιέλιπε* τὸ infra codd. (exc. *περιέλειπε* τὸ V^c) Ald.: *reliquit quae* utrobique Guil.: *περιελείπετο* coni. Scal. Sn.: *περιελείπετο* coni. Bk. Dt.

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obviously been disposed of. But it happens sometimes that both she and the husband emit more than they could dispose of, and more than enough. And so when the uterus has drawn in enough, but an excess has been received, then they are unaware of becoming pregnant. That such a thing is possible, and that the affection^a does not develop out of the whole of the emission, is shown by those animals that bear several young from one mating, and by the development of twins when it has resulted from one mating. For clearly it came out of not all the emission, but a particular^b place received a particular portion of it, and left over the remainder which was a multiple of it. Further, if several come from one mating, as is seen to happen sometimes in the case of pigs and of twins, clearly the seed does not come from all of the body, but was divided into parts in the case of each form.^c For there can be a separating off from all, and a separating of the all into many. And so it cannot at the same time be separated off

^a Pregnancy. For *πάθος* see note at 634a3.

^b The argument is not helped by deleting *τις*. In a multiple pregnancy each foetus must be formed separately out of one portion of seed in one place in the uterus. One foetus therefore requires less than all of the seed, and when it has been subtracted the remaining seed must be at least a multiple of the first portion if it is to provide for more foetuses. This argument is corrected and further developed at GA IV 771b27-772a37.

^c "Form" could refer either to each separate foetus or to

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each part of one foetus, but it probably makes no difference to the argument; possibly indeed it is intended in a general sense of 'formal difference'. The whole argument 637a5-15 supports the thesis that the foetus does not require to be formed out of all of the seed. At a5-9 Arist. has argued that multiple pregnancy proves that one foetus does not use up all the emitted seed. At a10-15 he argues

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that it also proves that the seed does not come from every part of the body, as believers in pangenesis supposed. That part of the argument is rapid and elliptic, no doubt because it was a familiar topic, but it can be filled out from the similar arguments in *GA* I against pangenesis; there is however a difficulty both here and in *GA*. Arist.'s argument is apparently as follows. If a multiple pregnancy results from a single emission of seed, then that one quantum of seed is divided among the foetuses; but this would not be possible if it had been drawn from all parts of the parent's body, for then each part of the seed would be different and all together would be needed to make one complete foetus; therefore pangenesis is inconsistent with multiple pregnancy. The argument appears to rest on the assumption that, in pangenesis, one emission could only bring one indivisible portion of seed from each bodily part, an assumption that seems clear in *GA* I 723b9-15, 729a5-9. From that assumption it follows that only one foetus could result; by refuting that form of pangenesis, therefore, Arist. removes a counter-argument against his thesis that not all of the emission is used in conception. It is puzzling, however, that this argument apparently ignores the simple practical solution used by Darwin, namely that the seed drawn from each part is itself divisible, so yielding more than one set of parts. This puzzle must cast doubt on the above interpretation. A further point is that at 637a14 the objection to pangenesis is presented as a logical objection, not a practical one: to obtain seed from each part is inconsistent with dividing the total amount of seed into quanta; but the logical inconsistency is not explained. For pangenesis see Anaxag. 59 B 10, Democr. 68 A 141, Hipp. *aer.* 14 (II 60 L), *morb. sacr.* 2 (VI 364 L), *genit.* 3, 8 (VII 474, 480), *morb.* IV 32 (VII 542).

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ἄδύνατον.

ἔτι ἡ γυνὴ προίεται εἰς τὸ πρόσθεν τοῦ στόματος τῶν ὑστερῶν, οὗ καὶ ὁ ἀνὴρ, ὅταν πλησιάσῃ. ἐντεῦθεν γὰρ σπᾶ τῷ πνεύματι, ὥσπερ τοῖς στόμασιν ἢ τοῖς μυκτῆρσιν. πάντα γὰρ ὅσα μὴ ὀργάνοις προσάγεται, ἢ εἰσφύσιν ἔχει ἄνωθεν κοῖλα ὄντα ἢ πνεύματι †ἔλκων ἢ†¹ ἐκ τούτου

¹ ἔλκων ἢ codd. Ald.: *trahunt* Guil. Trap.: *attrahuntur* Fel.: ἔλκονται coni. Scal. edd.

^a The following passage 637a16–35 is intelligible without re-writing if it concerns only the action of wind (pneuma) in drawing seed into the uterus. In particular, “outflow” at a26 and 28 must refer to wind, not to seed as Scot. and many edd. take it. The argument compares the action of the uterine cervix with that of the nose, amplifying the statement at 634b34. Any organ that sucks things in must either be hollow with an opening at the far end (like the nose) or use wind from within its own space (as the mouth does). The uterus naturally contains wind (634b34, 635b4, 636a4). In preparation for conception, therefore, it must first ‘breathe out’ (637a23), and this it does both through the cervix and through the urethra. Hence the place where the urethra opens outside is affected at this time (a25). The wind flows out into this place from the wider area within, through the narrow passage of the urethra (a26–28). In this respect it resembles the flow of air through the nose, which also comprises a

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part by part.

Further, the woman emits into the region in front of the mouth of the uterus where the man emits too when she has intercourse. For^a from there she draws it in by means of the wind, just as by mouths or nostrils. For everything that attracts without using instruments is either hollow with an inlet from above, or †draws†^b by means of wind from its

wider area and a narrow outlet. In the nose, the wider area leads to the outer air, and the narrow passage leads to the pharynx (larynx); in the cervix the wider area leads to the uterus, the narrower to the outer air. The outward breathing of the uterus therefore compares with the inward breathing of the nose; this fits Arist.'s theory that the cycle of respiration begins with inward breathing (*Resp.* 472b21) while the cervix's cycle begins with breathing out. The subsequent inward breathing of the uterus, whereby it draws in the seed, corresponds to the outward breathing of the nose, whereby it expels mucus. In each case the passage-way comprises a wider area and a narrow passage: the wider area permits the gathering of seed or of nasal mucus respectively, while the narrow passage is only wide enough to let air pass to the outside of the cervix or to the lungs respectively. It is assumed that the urethra connects with the cervix (a24), so providing a passage for air during coition. Edd. who have wished to make the comparison refer to the flow of seed (*Scal. Buss. Tricot. Dt.*) are compelled to substitute "inward" for "outward" at a30 and 35. They must also imply that the narrow passage leads from cervix to uterus, contrary to a24.

^b The MSS reading seems impossible. The required sense is offered by Guil. *trahunt*, and Scaliger's suggestion ἑλκονται (middle voice) is adopted by most edd.

- 20 τοῦ τόπου. διὸ ἐπιμελοῦνται ὅπως γένηται
 ξηρὸς οὗτος¹ ὥσπερ πρὶν τοῦτο συμβαίνειν.
 πέφυκε δ' οὕτως ἡ ὁδὸς δι' ἧς ἔρχεται ταῖς
 γυναιξίν. ἔχουσι καυλόν, ὥσπερ καὶ οἱ ἄνδρες τὸ
 αἰδοῖον, ἀλλ' ἐν τῷ σώματι.² ἀποπνέουσι διὰ
 τοῦτο μικρῷ τε πόρῳ ἄνωτέρῳ, ἣ οὐροῦσιν αἱ
 25 γυναῖκες. διὸ καὶ ὅταν ὀργῶσιν ἀφροδισιασθῆναι,
 οὗτος ὁ τόπος οὐκ ἔχει ὁμοίως καὶ πρὶν ὀργᾶν.
 ἀπὸ δὴ τούτου τοῦ καυλοῦ γίνεται ἔκπτωσις, καὶ
 τὸ ἔμπροσθεν τῆς ὑστέρας πολλῷ μείζον ἢ καθ'
 ἣν εἰς ἐκείνον τὸν τόπον ἐκπίπτει. ὅμοιον δ'
 ἐστὶ τοῦτο κατὰ τοῦτο ταῖς ῥίσιν· καὶ γὰρ αἱ
 ῥῖνες ἔχουσιν εἴσω εἰς τὸν φάρυγγα πόρον τινά
 30 καὶ εἰς τὸν ἔξω ἀέρα· οὕτω καὶ κεῖνος καὶ ἔξω ἔχει
 πόρον μικρόν τε πᾶνυ καὶ στενόν, ὅσον πνεύματι
 ἐξοδόν, τὸν δ' εἰς τὸ πρόσθεν τῆς ὑστέρας εὐρύ-
 χωρον εὖρουν, ὥσπερ αἱ ῥῖνες τὸν εἰς τὸν ἀέρα
 μείζω τοῦ εἰς τὸ στόμα καὶ φάρυγγα. ὁμοίως δὲ
 καὶ αἱ γυναῖκες μείζω τὸν εἰς τὸ ἔμπροσθεν τῶν

¹ οὕτως G^a Q F^a X^c Ott. Bk. Dt.: om. Ald.: *iste* Guil.

² σώματι (sic) S^c corr.: στόματι L^c Ald. Bk.: om. Scot.
 Trap.: *corpore* Guil.: *ore* Scal. Fel.

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present place.^a Hence they are concerned that this place^b should have become dry, as it was before this event. The way through which it goes is constituted as follows in women. They have a tube, just as men have the penis, but within the body. They let out wind because of this and by means of a small passage farther up, whereby women urinate. This is also why, when they are sexually excited, this place is not in the same state as before the excitement. Now it is from this tube that outflow takes place, and the region in front of the uterus is much larger than the way by which the outflow comes to that place.^c This is similar in this respect to the nose. For the nose too has a passage within to the pharynx^d and to the outside air; similarly that tube has on the outside a passage that is quite small and narrow, just enough to let wind out, while the passage to the region in front of the uterus is spacious, a good channel, just as the nose has the passage to the air larger than the one to the mouth and pharynx. Similarly in women the passage to the front of

^a That is, where it is; it uses wind from within itself, as the mouth does.

^b "This place" must be the region in front of the uterus (637a15) which should be dry if conception has taken place (cf. 637a1 note).

^c The place just indicated at a25, around the outlet of the small passage.

^d Often used for larynx.

35 ὑστερῶν πόρον ἔχουσι καὶ εὐρυχωρότερον τοῦ¹
ἕξω.

ὅ τι συμβάλλεται εἰς τοῦτο ποιεῖ τῶν αὐτῶν
παθημάτων ὅτι καὶ ἡ γυνὴ γόνιμον προίεται. τὰ
δ' αὐτὰ αἷτια ταῦτα συμβαίνει. καὶ γὰρ οἷς ἡ
νόσου ἢ θανάτου δοκεῖ ἑτέρου τὸ αἷτιον εἶναι,²
637b θεωροῦσι τὸ τελευταῖον ἐπὶ τὰς ἀρχάς, ὃ δεῖ
ὁρᾶν. τοῖς³ μὲν γὰρ ταῦτα⁴ αἷτια τὰ πρῶτα,

¹ τὸ codd. Ald. Bk.: *magis quam extrinsecum* Scot.: *ampliolem eo qui extra* Guil.: *latiore foris* Trap.: *exterior amplior* Fel.: τοῦ coni. Scal. Sn. Pk. Dt. Louis

² D^a R^c V^c Guil. Dt.: om. cett. Bk.

³ codd. Ott. Dt.: ταῖς Ald. Bk.

⁴ codd. Ald.: *easdem* Scot.: *hee cause* Guil.: ταῦτα coni. edd.

^a The following argument 637a35–b6 is again rapid and difficult. Among the variety of affections experienced after intercourse, those affections that have a common cause—namely the woman's emission of fertile seed—will be the same; other causes will produce other affections; and so the extent to which one woman's affections will be the same as another's, so far as the affections due to intercourse are concerned, will depend on the extent to which each has emitted fertile seed in the same conditions of bodily health and residues which were explained at 636b24 ff and passim. So too in medicine varying cases of illness or death may be traceable to a cause which has been recognised as causing some other effects as well: that is to say, both these cases and the other effects share a pri-

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the uterus is larger and more spacious than the outside one.

The^a woman's contribution brings about the same affections to the extent that she too emits a fertile seed. And they are accompanied by these same causes. For those too who believe that an illness or a death is due to another thing's cause, examine the final effect back to its beginnings, which is what they need to see. For some things have the same causes in the first place, others do

many cause among whatever other causes they may have had. In some cases all the primary causes are the same; in others none are the same; in yet others some causes are the same while some are not. The affections experienced by women will match the causes: if all the causes are the same, all the affections will be the same; if some causes are the same, some affections will be the same; if no causes are the same, the affections will not be the same. The passage therefore continues the case for saying that the female contributes seed (636b15); it returns to the question of the affections which follow conception (636b24–637a4) and now provides a general argument that all these varied affections, such as dryness, moisture, weakness, strength, spring from—and point to—one primary cause, namely the emission of fertile seed in varying quantities and circumstances as explained in 636b26 ff. The intervening passage 637a5–35 was needed to explain how varying proportions of the seed can be used or left behind, and how it is drawn into the uterus. 637b6 ff continues the argument by giving evidence that the same cause (fertile emission) produces the same affections in all female animals. Other edd. have given different interpretations of 637a35–b6, some holding that it is displaced.

τοῖς δὲ οὐδέν, τῶν δὲ τὰ μὲν τὰ δ' οὐ. ἀποδίδω-
 σιν οὖν κατὰ λόγον καὶ τὰ ἀποβαίνοντα· καὶ
 τοῖς μὲν διὰ πάντων συμβαίνει διελθεῖν τῶν
 5 αὐτῶν παθημάτων, τοῖς δὲ διὰ πολλῶν οἷς
 πολλά· τοῖς δὲ δι' ὀλίγων· τοῖς δὲ δι' οὐθενὸς
 ὅσοις μηδέν.

VI φανερὰ δὲ τὰ ζῶα ἐστὶν ὅταν ὀχευθῆναι
 δέηται. δῖωκει γὰρ τὰ ἄρρενα, οἷον αἱ ἀλεκτορί-
 δες διώκουσι καὶ ὑφίζανουσιν αὐταὶ ἐὰν μὴ ὀργᾶ
 ὁ ἄρρην. τοῦτο δὲ ποιεῖ καὶ ἄλλα ζῶα. εἰ δὲ
 10 ταῦτά πάθῃ πᾶσι τοῖς ζώοις φαίνεται ὄντα περὶ
 τὴν συνουσίαν, δῆλον ὅτι καὶ τὰ αἷτια συνβαί-
 νοντα. ἀλλὰ μὴν ἢ γε ὄρνις οὐ μόνον τοῦ λαβεῖν
 ἐπιθυμίαν ἔχει, ἀλλὰ καὶ τοῦ προέσθαι. σημεῖον
 δὲ τούτου· ἐὰν γὰρ μὴ παρῇ¹ ἄρρην, πίπτει ὑπ'
 αὐτὴν καὶ ἔγκυος γίγνεται καὶ τίκτει ὑπηνέμια,
 15 ὥς ἐπιθυμοῦσα καὶ τοῦ ἀφεῖναι τότε, καὶ ἀφεῖσα
 ὅταν καὶ τῷ ἄρρενι² συνῇ. ποιεῖ δὲ τοῦτο καὶ
 τᾶλλα, ἐπειδὴ καὶ τῶν ἄδουσῶν ἀκριδῶν ἤδη τις

¹ παρῇ ὁ G^a Q F^a X^c L^c Ald. edd.: incert. S^c

² post ἄρρενι add. ἀνῆρ ex 636a6 per errorem Ald. Bas.
 Bk. Buss. A.-W. Dt. Louis: ὑπαρ καὶ μὴ ὄναρ coni. Pk.

^a Taking ὑπ' αὐτὴν as ὑφ' αὐτὴν to describe the hen

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not, and yet others have some that are and some that are not. The effects that they produce, therefore, are also in proportion: in the first case the result is that they go through all the same affections; others, for whom many causes are the same, go through many of the same affections; others go through few; and others, for whom none are the same, go through none.

The animals show when they need mating. For VI they pursue the males, for example the domestic hens pursue them and sit under them of their own accord if the male is not excited. Other animals do this too. Now if the same affections are seen to occur in all animals in relation to coition, it is clear that the causes too are taking place. But now the hen bird, at least, has a desire not only to receive but also to emit. There is evidence of this. For if a male is not present, she drops down under herself^a and becomes pregnant and lays wind-eggs, showing that she desires also to emit then, and that she does emit when she actually mates with the male.^b The others do this too, for there was a woman who made

crouching as though under a male. For the common confusion in MSS over the aspiration of αὐτός cf. 635a21 ἀφ' αὐτοῦ for ἀπ' αὐτοῦ, 637b29, 32, 33, 638a9, 21, 27. It remains an odd expression here, however. Many conjectures have been made. At VI 560b30 Arist. says instead that the females mount each other, which would suggest ἀλλήν here rather than ἀντήν (so conjectured by Dt. Louis).

^b See Additional Note on 636a6.

ἐπειράθη τρέφουσα, ἔτι ἀπαλὰς λαβοῦσα· καὶ
ἐγένοντο αὐξήθειαι¹ αὐτόματοι ἔγκυοι. ἐκ δὴ
τούτων δῆλον ὅτι συμβάλλεται εἰς τὸ σπέρμα
20 πᾶν τὸ θῆλυ, εἴ γε καὶ ἐφ' ἐνὸς γένους φαίνεται
τοῦτο γιγνόμενον. οὐδὲν γὰρ διαφέρει τὸ ζῶον
τὸ ὑπηνέμιον τούτου, ἀλλὰ τῷ μὴ γεννᾶν ζῶον.
τοῦτο δ' ὅτι καὶ παρ' ἀμφοῖν ἦλθεν. διὸ οὐδὲ τὰ
ἀπὸ τοῦ ἄρρενος ἅπαντα γόνιμα φαίνεται, ἀλλ'
ἔνια ἄγονα ὅταν μὴ ἐξ ἀμφοῖν ὥς δεῖ συναρ-
25 μοσθῇ. ἐπεὶ² γυναῖκες ἐξονειρώττουσι, καὶ ταύ-
ταις γίνεται, ὥς ὅταν συγγένωνται ἀνδρί, ταῦτά
παθήματα μετὰ τὸν ὄνειρωγμόν, διάλυσις καὶ
ἀδυναμία. δῆλον τοίνυν, εἴ ἐν τῷ ἐξονειρωγμῷ
φαίνονται προϊέμεναι καὶ τότε συμβάλλονται, ὅτι
μετὰ τοὺς ἐξονειρωγμοὺς ὁ αὐτὸς τόπος ἀφυγραί-

¹ D^a R^c V^c Scot. Guil. Dt.: om. G^a Q F^a X^c S^c L^c Ald. Trap. Fel. Bk.

² codd. Ald. Guil.: ἔτι coni. Scal. edd.

^a The parenthesis looks like an interpolated gloss; to be valid, it would need the further premiss that animals which have male and female cannot differ in respect of the female contribution. But that would not be relevant to Arist.'s argument here, which would go better without this

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trial of the singing grasshoppers which she reared after catching them while still tender; and when they had grown they became pregnant spontaneously. It is clear from these things, then, that every female contributes to the seed (at least if this is seen to be the case in one kind).^a For there is no difference between the animal that is due to wind-pregnancy and this one, except that it fails to generate an animal. This one generates because it came from both parents too. Hence the male contributions too are not all found to be fertile, but some are infertile when there has not been the due harmonising of both contributions. For women emit in dreams and experience the same affections after the dream-emission as after intercourse with a man, debilitation and incapacity. Accordingly, if it is evident that they emit during the dream-effusion, and if they then contribute, it is plain that after dream-effusions the same place becomes moist and they

feeble parenthesis. For he has now provided an instance of unfertilised viviparous conception (grasshoppers produce larvae, V 555b23) alongside the instance of unfertilised egg, so that both general methods of sexual generation have been represented. If it is true that there is no other difference between the unfertilised and the fertilised except that the former lacks the male contribution, then the female has made the same contribution to both kinds of generation. The way that he expresses this contribution ("contributes to the seed", a19) is itself unobjectionable in Arist.'s theory (see note at 634b29).

30 νεται καὶ θεραπείας δέονται τῆς αὐτῆς αὐταὶ ὑφ'
αὐτῶν ὥσπερ ὅταν συγγένωνται ἀνδρί. ὥστε
φανερὸν ὅτι παρ' ἀμφοῖν γίνεται πρόσεις¹ σπέρ-
ματος εἰ μέλλει γόνιμον ἔσεσθαι.

 προίενται δ' οὐκ εἰς αὐτὰς αἱ ὑστέραι ἀλλ'
ἔξω, οὗ καὶ ὁ ἀνὴρ· εἴτ' ἐκείθεν ἔλκει εἰς αὐτάς·
ᾧν τὰ μὲν γεννᾷ ἀφ' αὐτῶν τὰ θήλεα οἶον ὄρνις
35 (τὰ δ'² ὑπηγνέμια), τὰ δ' οὐθὲν οἶον ἵπποι καὶ
πρόβατα. ἢ ὅτι ἡ μὲν ὄρνις εἰς τὴν ὑστέραν
προίεται, καὶ οὐκ ἔστιν ἔξω τόπος εἰς ὃν ἀφίησιν
οὐδὲ ὁ ἄρρην· διὸ ἐὰν μὴ τύχη ὀχεύων, εἰς τὴν γῆν
ἐκχεῖ· τοῖς δὲ τετράποσιν ἔστιν ἔξω τόπος
638a ἄλλος εἰς ὃν καὶ τὸ θῆλυ προίεται καὶ τὸ ἄρρεν·
ὅπερ τοῖς μὲν ἄλλοις μετὰ τῶν ἄλλων ὑγρῶν
συγχεῖται καὶ οὐ συνίσταται ἐν τῇ ὑστέρᾳ διὰ τὸ
μὴ εἰσιέναι, ταῖς δ' ὄρνισι λαβοῦσα ἡ ὑστέρα
συμπέττει καὶ σῶμά τι ὅμοιον τὰ ἄλλα πλὴν οὐ
5 ζῶον· διὸ δεῖ ἐξ ἀμφοῖν τὸ ζῶον εἶναι.

¹ προ. τοῦ G^a Q F^a X^c S^c L^c Ald. edd.

² codd. Ald. Guil.: om. Scot. Fel. edd.

^a This is the style of the *Problems*, in which, after a question "Why . . .?", the proposed answer is expressed as another question introduced by ἢ ὅτι. Here the problem

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need to apply the same treatment to themselves as after intercourse with a man. And so it is evident that emission of seed occurs on both sides if it is to be fertile.

The uterus does not emit into itself but outside, where the man too emits; then from there she draws it into the uterus. Among these animals, in some cases the females generate from themselves, for example birds, though they are wind-eggs; but others generate nothing, for example mares and flocks. Is^a this because the bird emits into the uterus, and there is no place outside into which either she or the male discharges? And hence the male spills it to the ground if he fails to achieve mating. In the quadrupeds on the other hand there is another place outside into which the female emits as well as the male. In the other animals her emission mingles with the other fluids and is not constituted within the uterus because it does not enter it, but in the birds the uterus has received it and even concocts a body of sorts, similar in other respects but not an animal. Hence the animal must come out of both.

has not been expressed as a question, but the section begins with a previously accepted statement (that seed is emitted outside the uterus) to which an exception is now to be made. The problem engendered by this statement is, why do only certain females, and not all, generate from themselves? Arist.'s answer is that these females do not emit seed outside the uterus but inside it. This answer will in turn raise a further problem at 638a5.

ARISTOTLE

- VII ἔστι δ' ἐνστῆναι, εἰ ἀληθῆ λέγουσι φάσκουσαι,
 ὃ τι ἂν¹ ἐξονειρώττωσι, ξηραὶ ἀνίστασθαι. δῆλον
 γὰρ ὅτι ἔλκει ἢ ὑστέρα ἄνωθεν· ὥστε διὰ τί οὐ
 γεννᾷ αὐτὰ καθ' αὐτὰ τὰ θήλεα, ἐπείπερ καὶ
 μιχθὲν ἔλκει τὸ τοῦ ἄρρενος; διὰ τί οὐχὶ καὶ αἱ
 αἶγες τὸ αὐτῆς ἔλκει, ὅπερ εἰς τὸ ἔξω διατείνει;
 10 αἷς γίνεται τοῦτο τὸ πάθος κυούσαις ἔτη πολλά.

¹ ὃ τι ἂν codd. Ald.: ὅταν coni. Sn. Bk. Dt.

^a This is Arist.'s technical expression for a counter-proposition which refutes a premiss; cf. *An. Pr.* B 26. 69a37.

^b "She-goats", αἱ αἶγες, is read by the Greek mss and Latin versions, and was accepted by all edd. until Piccolos proposed the elegant emendation ἀμιγῆς ("unmixed") which has been adopted by some edd. since. That would give the sense "why does not the uterus draw in its own emission unmixed?", which is easier to understand and could well be right. Nevertheless the mss reading is defensible. The she-goats are among the flocks mentioned at 637b35 as being unable to generate anything by themselves (for πρόβατα = sheep and goats cf. VIII(IX) 627b5 note). But if women both emit seed and draw it in by themselves, why do not she-goats for example draw it in too? And why do not all females consequently generate the equivalent of wind-eggs? For after all, they sometimes produce moles, as in the case of a certain woman . . . One advantage of the

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VII

But there is a possible objection,^a if women are telling the truth when they assert that, whatever dream-emission they have, they are dry on rising. For plainly the uterus draws it in from above; and so why do not the females generate by themselves, since it is granted that the uterus draws in the male emission too when it has been mixed? Why do not the she-goats^b too draw in their own emission, since it reaches the place outside? For women experience the following affection, remaining pregnant for

traditional reading is that 638a10 connects with both sense and syntax. Another is that it makes a move forward in the argument instead of repeating a point that has already been well established. For the point that human females emit seed and then draw it back into the uterus has been exhaustively made on this same evidence of dream-emissions at 634b30, 635a34, 635b32, 636b24, 637b24. Evidence from wind-eggs was added at 637b10, and from parthenogenetic grasshoppers, so enabling the conclusion to all female animals. But the wind-eggs raised the problem why those females which, unlike birds, emit outside, but then draw the seed back, should not be capable of a development analogous to wind-eggs, especially when there is evidence of the human "mole". But after describing the mole, *HA* X offers two alternative explanations of it, treating it first (638a14) as an incomplete generation like the wind-egg, but then secondly in what appears to be a preferred solution (638b1) as not a generative process at all but an accidental confluence of residues. *GA* IV 775b37, however, seems to accommodate both the *HA* explanations in a single brief summary: the mole is a foetal development (*κύημα*) which is insufficiently heated.

τίκτουνσι γὰρ ὁ καλοῦσι μύλην, οἷον συνέβη τινὶ
 γυναικί. συγγενομένης τῷ ἀνδρὶ καὶ δοξάσης
 συλλαβεῖν ὃ τ' ὄγκος ἠϋξάνετο τῆς ὑστέρας καὶ
 τᾶλλα ἐγίγνετο τὸ πρῶτον κατὰ λόγον. ἐπεὶ δ'
 ὁ χρόνος ἦν τοῦ τόκου, οὔτε ἔτικτεν οὔτε ὁ ὄγκος
 15 ἐλάττων ἐγίγνετο, ἀλλ' ἔτη τρία ἢ τέτταρα
 οὕτω διετέλεσεν, ὡς¹ δυσεντερίας γενομένης καὶ
 κινδυνευσάσης αὐτῆς ἔτεκε σάρκα εὐμεγέθη, ἣν
 καλοῦσι μύλην. ἐνίαις δὲ καὶ συγκαταγερᾷσκει
 τὸ πάθος καὶ συναποθνήσκει.

πότερον δὴ² διὰ θερμότητα γίνεται τὸ πάθος
 20 τοῦτο, ὅταν τύχη ἡ ὑστέρα θερμὴ καὶ ξηρὰ οὔσα
 καὶ διὰ ταῦτα σπαστικὴ πρὸς αὐτήν, καὶ οὕτως
 ὥστ' ἔστιν ἀνελέσθαι καὶ φυλάξαι πρὸς αὐτήν;
 οὕτω γὰρ ἐχούσαις, ἐὰν μὴ μεμιγμένον ἐστὶ τὸ
 ἀπ' ἀμφοῖν, ἀλλ' ὥσπερ τὸ ὑπηγνέμιον ἐνδέξαιτο
 ἀπὸ θατέρου, τότε γίνεται ἡ καλουμένη μύλη,
 οὔτε ζῶον, διὰ τὸ μὴ παρ' ἀμφοῖν, οὔτε ἄψυχον,

¹ codd. Ald.: *tandem* Guil. Trap.: *donec* Fel.: *ἕως* conl.
 Sylb. edd.: cf. GA 775b32

² D^a R^c V^c: incert. S^c: δὲ cett. Bk. Dt.: *igitur* Guil.

^a Lit. "mill-stone". The account at 638a10–18 is almost identical with GA IV 775b25 ff, and the subsequent discus-

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many years. They bear what they call a mole,^a as happened to a certain woman. After she had intercourse with her husband and thought she had conceived, the uterus increased in bulk and everything else took place at first as expected. But when the time came for the birth, neither did she begin to give birth nor did the bulk diminish, but she continued thus for three or four years, when on contracting dysentery and becoming dangerously ill she gave birth to a very large mass of flesh, which they call a mole. In some women the affection persists even to old age and death.

Now is heat the cause of this affection, when the uterus happens to be hot and dry and for that reason apt to draw things to itself, to such a degree that it can take them up and keep them to itself? For when they are in this state, if the emission from both has not been mixed but the uterus could take in the emission from one of them like the wind-egg, then there develops the so-called mole, being neither animal, because it has not come from both, nor

sion here makes the same points as the far briefer summary in *GA*. The extract in *Ar. Byz. epit.* I 81 (24.13 Lam-bros) is less close. The Hippocratic discussion of mole (*mul.* 71, 178, *VIII* 148, 360 L) seems unrelated to *GA* and *HA*. The *Problems* style of question and answer appears again (637b35). In the *GA* account there is a reference to a discussion of mole in "the problems", which is not found in the work now extant under that title. Sn. suggested that at least this passage of *HA X*, if not more, was included in the original and genuine *Problems*.

- 25 διὰ τὸ ἔμψυχον ληφθὲν εἶναι, ὥσπερ τὰ ὑπη-
νέμια. πολὺν δὲ χρόνον ἐμμένει διὰ τε τὴν τῆς
ὑστέρας διάθεσιν, καὶ διότι ἡ μὲν ὄρνις πολλὰ εἰς
αὐτὴν τίκτουσα, ὑπὸ τούτων γινομένης τῆς
ὑστέρας, προσάγει καὶ τίκτει· καὶ ὅταν ἅπαξ
οἰχθῇ, καὶ τὸ τελευταῖον ἐξέρχεται. οὐ γάρ ἐστι
30 τὸ εἶργον, ἀλλὰ κατὰ σῶμα προετικὸν γενόμενον
ὅτε ἐπληροῦτο, οὐκέτι τὴν ὑστέραν ποιεῖ ἀντι-
σπαστικὴν. ὅσα δὲ ζωοφορεῖ, διὰ τὸ μεταβάλ-
λειν τὴν δύναμιν αὐξανομένου καὶ ἄλλοτε
ἀλλοίως δεῖσθαι τροφῆς, ἐπιφλεγμαίνουσά τι ἡ
ὑστέρα ποιεῖ ταῦτόν τόκον. ἡ δὲ σὰρξ, διὰ τὸ μὴ
35 ζῶον εἶναι, ἀεὶ τῶν ὀμαλῶν. δεῖ γὰρ ὁ βαρύνει
τὴν ὑστέραν οὐδέν, οἶει, φλεγμαίνειν. ὥς ἐνίαις

^a This agrees with the theory of GA by which the female contribution (and therefore wind-eggs too) possesses nutritive soul which causes growth, but not the sensitive soul which is necessary for animal life (GA II 741a18 ff, III 757b16).

^b The argument seems to be as follows. The reason why moles remain in the uterus excessively long, while wind-eggs do not, lies in the difference between the viviparous and oviparous uterus. As soon as wind-eggs fill the bird's uterus, it proceeds to discharge them, since its function is simply to be a container and to lay the eggs when it is 'full', i.e. when it is pregnant with its full complement of eggs

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soul-less, because it has been received ensouled,^a like the wind-eggs. And it remains within for a long time both because of the condition of the uterus and for the following reason.^b On the one hand the bird bears many eggs within herself, and the uterus is controlled by them; she brings them forward and lays them; and when once the uterus has been opened, even the last egg comes out; for there is nothing preventing them, but in the manner of a body that became emissive once the uterus had been filled, it no longer makes the uterus draw in the opposite direction. On the other hand in all viviparous animals, because the capability of the growing foetus changes and it needs different nourishment at different times, it is only through being inflamed by a particular object that the uterus brings that same object to birth. But the flesh, because it is not an animal, continues to act as a smooth object. For a thing which burdens the uterus is not bound, presumably, to inflame it. For

(for *πληροῦν* with its common connotation of pregnancy, as in the French 'plein', cf. VI 574a20, X 636a30, 638b2, *Metaph.* A 988a6, *Hipp. mul.* II 169, VIII 348 L). But the viviparous uterus, whose function includes nutrition, does not give birth until the embryo's increasing diversification and movement inflames the uterus and causes it to discharge the irritant. Since the mole is smooth and inert, it does not bring about the discharge; for the mere fact that something burdens the uterus cannot be enough to inflame it (for that would make pregnancy impossible).

γε καὶ συναποθνήσκει τὸ πάθος, ἐὰν μὴ δι' εὐτύ-
χημα ἀσθενήματος συμβῇ, οἷον τῇ ληφθείσῃ ὑπὸ
τῆς δυσεντερίας.

- 638b πότερον δ', ὥσπερ εἴρηται, διὰ θερμότητα
γίνεται τὸ πάθος ἢ μᾶλλον δι' ὑγρότητα (ὅτι καὶ
ἔστι τὸ πλήρωμα) οἷον μύει; ἢ ὅταν μὴ οὕτως ἢ
ψυχρὰ ἢ ὑστέρα ὥστε ἀφεῖναι, μηδ' οὕτω θερμῇ
ὥστε πέψαι; διὸ καὶ χρόνιον τὸ πάθος, ὥσπερ
5 τὰ¹ ἐν ἐψήσει πολὺν χρόνον διαμένει. τὰ δ'
ἐψόμενα πέρας ἔχει καὶ ταχυτήτα. αἱ δὲ τοι-
αῦται ὑστέραι ἀκρόταται οὔσαι τὸν χρόνον
ποιοῦσι πολύν. ἔτι δὲ τὸ μὴ ζῶον εἶναι, οὐ²
κινούμενον οὐ ποιεῖ τὴν ὠδῖνα· ἡ γὰρ κίνησις
τῶν συνδέσμων ὠδὶς ἐστίν ἢν, διὰ τὸ ζῆν, προ-
10 ἴεσθαι τὸ ἔμβρυον. καὶ ἡ σκληρότης δ' ἡ γιγνο-
μένη τοῦ πράγματος μωλύνσεως³ ἔργον ἐστίν.
οὕτω γὰρ γίνεται σκληρὸν ὥστε πελέκει οὐ
δύνανται διακόπτειν. τὰ μὲν οὖν ἐφθὰ καὶ
πάντα τὰ πεπεμμένα μαλακὰ γίνεται, τὰ δ'
ἀπολελυμένα ἄπεπτα καὶ σκληρὰ.

¹ καὶ τὰ G^a Q F^a X^c S^c L^c Ald. edd.

² D^a R^c V^c Dt.: μὴ G^a Q F^a X^c S^c L^c Ald. Bk.

³ κωλύσεως codd. Ald. Fel. Bk.: ex corruptione Scot.:
molliens eo v. l. mollinseos Guil.: μολύνσεως conl. Sn.: cf.
GA 776a8

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some women in fact have the affection until death, except as the result of a fortunate ailment as in the woman seized by dysentery.

But is heat the cause of the affection, as we said,^a or is it rather because of fluid—something that in fact constitutes the fullness of pregnancy—that it closes its mouth as it were^b? Or is it when the uterus is not cold enough to discharge it nor hot enough to concoct it? And hence the affection lasts long too, just as things in boiling take a long time. But things being boiled have a limit and a speed. But the uterus in this state at its most extreme prolongs the time greatly. Further, in relation to its not being an animal, through failing to move it fails to cause birth-labour; for labour is the ligaments' movement, caused by the embryo's being alive, in which to expel the embryo. Moreover the hardness that develops in the thing is the effect of parboiling. For it becomes so hard that they cannot cut it up with an axe. Now things that have been boiled and all that have been concocted become soft, but things left undone are unconcocted and hard.

^a 638a18.

^b *μύει* and *πλήρωμα* are the language of pregnancy (cf. 635a30, 636a38, and note at 638a26): the uterus is "full" and "closes its mouth, as it were" (Arist. treats this as a metaphor, presumably because it is not now being considered as a pregnancy).

- 15 ὅ τι πολλοὶ ἰατροὶ ἀγνοοῦντες δι' ὁμοιότητα
 μύλας εἶναι τὸ πάθος πάσχουσιν,¹ ἂν μόνον ἴδωσι
 τάς τε κοιλίας ἐπαιρομένας ἄνευ ὕδρωπος καὶ
 τῶν ἐπιμηνίων σχέσιν, ὅταν χρονίζῃ τοῦτο τὸ
 πάθος. τὸ δ' οὐκ ἔστιν, ἀλλ' ὀλιγάκις γίνονται
 αἱ γιγνόμεναι μύλαι.
- 20 ἄλλοτε μὲν σύρρους γίνεται ψυχρῶν καὶ ὑγρῶν
 περιττωμάτων καὶ ὑδαρῶν, ἄλλοτε δὲ παχυτέ-
 ρων, εἰς τὸν περὶ τὴν κοιλίαν τόπον, ἐὰν τὴν
 φύσιν τοιαῦτα ἢ τὴν ἕξιν ᾧσιν.² ταῦτα γὰρ οὔτε
 ὀδυνηρὰν παρέχει οὔτε θερμότητα διὰ ψυχρό-
 τητα. αὔξησιν δὲ λαβόντα τὰ μὲν μείζω τὰ δ'
 ἐλάττω, οὐδεμίαν ἄλλην ἐπισπῶνται νόσον παρ'
- 25 ἑαυτά, ἀλλ' ὥσπερ πῆρωμά τι ἡσυχάζει. ἢ δ'
 ἀπόλεψις τῶν καταμηνίων γίνεται διὰ τὸ δεῦρο
 καταναλίσκεσθαι τὰ περιττώματα, ὥσπερ καὶ
 ὅταν θηλάζωνται· καὶ γὰρ ταύταις ἢ οὐ γίνεται
 ἢ ὀλίγα. ἔστι δ' ὅτε καὶ εἰς τὸν μεταξὺ τόπον
 τῆς ὑστέρας καὶ τῆς κοιλίας συρρέον ἐκ τῆς σαρ-
- 30 κὸς δοκεῖ μύλη εἶναι, οὐκ οὔσα. ἔστι δ' οὐ χαλε-

¹ codd. Ald. Guil.: dicunt . . . putant Scot.: λέγουσιν coni. Bas. edd.

² τὴν φ. τοι. ἢ (sic) τὴν ἕξιν ᾧσιν D^a R^c V^c: incert. S^c: τὴν φ. τ. ἢ ἢ τὴν ἕξιν G^a Q L^c Ald. Bk.: τοιαῦτα ἢ τὴν φ. ἢ τὴν ἕξιν F^a

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Not knowing all this, many doctors allow that the affection is moles because of similarity, if they have merely seen the bellies becoming raised without a dropsy, together with a retention of the menses, when this affection is prolonged. But it is not one, but the moles that do develop develop rarely.

A confluence occurs, sometimes of cold and fluid and watery residues, sometimes of more solid ones, into the region of the belly, if the residues are of this kind^a by nature or by condition. For these cause neither a painful belly nor heat, because of their coldness. And having increased in size, some more and some less, they attract no other ailment along with themselves, but remain quiet like some deformity. The cessation of the menses occurs because the residues are expended upon this, just as when women are suckling; for they too have either no menses or little. Sometimes too there is a confluence out of the flesh^b into the region between the uterus and the stomach, which is thought to be a mole but is not. It is not difficult to tell, if there is a

^a That is, if the body's residues are cold (either naturally or because of a particular condition) so that they do not stimulate the uterus to expel them.

^b The flesh of the woman's body generally.

X^c: *si secundum naturam talia aut secundum habitum fuerint* Guil.

ARISTOTLE

πὸν γνῶναι, ἂν μύλη θιγγάνουσα ἢ τῆς ὑστέρας.
 εἰ γὰρ ἢ εὐσταλὴς καὶ μὴ ἔχουσα αὐξήσιν,
 δῆλον ὅτι οὐκ ἐν ἐκείνῃ τὸ πάθος. εἰ δὲ τοι-
 αύτῃ ἢ οἷον ὅτε παιδίον, ἔχει μύλην· θερμὴ τε
 καὶ ψυχρὰ καὶ ξηρὰ ἔσται διὰ τὸ εἶσω τετράφθαι
 35 τὰ ὑγρά, καὶ τὸ στόμα τοιαύτῃ οἷον ὅταν κύωσιν.
 εἰ δέ τι ἄλλο ἢ ὁ ὄγκος, ἔσται ψυχρὰ θιγγανο-
 μένη καὶ οὐ ξηρά, καὶ ἀεὶ τὸ στόμα ὅμοιον.¹

¹ post ὅμοιον add. iterum 636b39 μάλιστα . . . 637a9 πολ-
 λαπλάσιον nonnullis mutatis (q.v. ad 636b39 ff) codd. Ald.
 Scot. Alb. Guil. (exc. om. Guil. (V)): om. Trap. Fel. Bas. edd.

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mole touching the uterus.^a For if the uterus is well shaped and has not increased in size, plainly it does not contain the affection. But if its state is such as when it contains a baby, it has a mole; it will be both hot and cold and dry because the fluids have been diverted inwards, and at the mouth it will be as in pregnancy. But if the lump is something else the uterus will be cold to the touch and not dry, and the mouth will remain unchanged.

^a The Latin versions all have "if the uterus is touched", which has prompted conjectures expressing manual examination. The Hippocratic treatises recommend digital examination in various circumstances, but none resembling this (cf. Hipp. *steril.* 213, 230, VIII 410, 438 L, and the other passages cited by Rudberg 1911 p. 15).

ADDITIONAL NOTES

On 593a15

"Wood pigeon": The γ MSS have two names ($\phi\acute{\alpha}\psi$ $\phi\acute{\alpha}\tau\tau\alpha$) both here and in the following line; the α MSS and William have only one name, $\phi\acute{\alpha}\tau\tau\alpha$, in both places; the β MSS have only $\phi\acute{\alpha}\psi$ in both places; Gaza's *palumbes* represents one only in each place; Scot. has only three names altogether in each, and his *palumbi* must represent $\phi\acute{\alpha}\psi$ and/or $\phi\acute{\alpha}\tau\tau\alpha$ as well as *περιστερά*. This is the only passage in Arist. that would necessitate our regarding $\phi\acute{\alpha}\psi$ and $\phi\acute{\alpha}\tau\tau\alpha$ as two different pigeons, assuming the γ MSS to be correct and the $\alpha\beta$ MSS incorrect here. Elsewhere the two names seem to be interchangeable (cf. VI 563b32, VIII(IX) 613a12-25). Th. agrees with Keller that both names refer to the same bird, i.e. the wood pigeon or ring-dove, *Columba palumbus* (Th. G. G. B. s.v.; O. Keller, *Die antike Tierwelt* II 127). Athenaeus, however, reports that "Aristotle" said that the pigeons form one genus with five species, giving them in order of size as $\phi\acute{\alpha}\tau\tau\alpha$ $\acute{o}\lambda\eta\delta\varsigma$ $\phi\acute{\alpha}\psi$ *περιστερά* *τρογών* (Ath. IX 393F = Arist. fr. 271, 1527a12). This is repeated by Eustathius *ad Hom. Od.* p. 475 Basil. Ath. and Eust. are cited by Gesner *Hist. Anim.* (section on *palumbes* under "*Columba*" in the volume on birds) as authorities for his view that there were two forms of wood pigeon, a greater and a lesser (*palumbes maior et minor*), known to Arist. Gesner's view was accepted by Casaubon (*ad Ath.* l.c.) and Camus (II.717), from whom this distinction between "grand ramier" and "petit ramier" was accepted by B.-St. Hilaire, Tricot, Louis, and L.-V. in their translations and

ADDITIONAL NOTES

notes. On the other hand Scaliger had already doubted that *φάψ* and *φάττα* were different names at all, and Schneider (III.292) thought Ath.'s report unreliable. Indeed it is clear that, although Ath. likes to name his authorities, he quotes "Aristotle" not direct but from an excerptor, in this particular case from two excerptors, for in this one section he gives two versions of *HA* VIII(IX) 613a2, of which one is much closer than the other but neither is accurate (Ath. IX 394B, F). For the degree of inaccuracy in such excerpts, see *ibid.* 394C where *πελειάς* and *περιστέρα* have been reversed in the excerpt from *HA* V 544b3. Similarly Aelian IV 58 reverses the order of sizes which *HA* gives as *φάψ φάττα οινάς περιστέρα* (cf. *HA* VII(VIII) 593a19). Arist. himself never says that the pigeons form one genus with five species; in fact he never speaks of animals in this way. At *HA* V 544b1 he says there are many kinds (*γένη*) of the pigeon-type birds and proceeds (apparently excluding *πελειάς*) to name four, whose sizes in descending order are *φάττα οινάς περιστέρα τρυγών*. This agrees with VII(VIII) 593a19, which says that *οινάς* is bigger than *περιστέρα* but smaller than *φάψ*. In Greek literature *φάψ* is the rarer form, *φάττα* very common. The probability is therefore that at 593a15 and 16 *φάττα* was an explanatory gloss on *φάψ* (or, as Dt. and Th. suggest, stood as an alternative in the text, *φάψ ἢ φάττα*). Now at 593a20 C^a reads *ἐλάττον* for *ἐλάττων* as it does also at 544b2: if this is an old variant, and if it had been taken here to agree with *μέγεθος*, with *φαβδός* as possessive genitive, the order of size would be *οινάς φάψ περιστέρα* as Ath.'s excerpt has it. However that may be, it can be said that there is no basis in Arist. for a distinction between greater and lesser wood pigeon (nor is there in nature): it is a nice piece of grammarians' natural history, with the added irony that it might have derived from a mistaken interpretation of a false variant.

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On the order of the text after 631b18

Gaza, L^c, Ald., Bas. re-ordered the text after 631b18 as follows: 633a11–28, 632b14–633a11, 633a29–b8, 631b19–632b13. O^cR^c have signs in the text at these places. Cs. and Sn. follow these changes, but place 632b14–633a11 after 631b18, i.e. they give Bk.'s chapters 49, 49B, 50 in that order; Cs. and Sn. however have their own chapter divisions. Bk. restored the MSS order and labelled as 49B that part which the third Basel edition includes with 631b5–18 in its chapter 49. (The Greek MSS and the first Aldine, Juntine and Basel editions do not separate or number any chapters; Bk.'s chapter divisions are taken from the third Basel edition 1550, whose editor Isingrinus introduced them into the Greek text in his second edition 1539. Isingrinus' source was a printed edition of Gaza's translation, 1492 or after; the divisions in the first printed edition of Gaza 1476, in the Gaza MS Vat. 2094, and in the MSS of the other Latin versions occur at different and varying points. See A. Gotthelf in *Theophrastean Studies*, ed. W. W. Fortenbaugh and R. W. Sharples, New Brunswick, NJ, 1988, 130, n. 27.) In this edition the text follows Bk.'s order, which is that of the Greek MSS (except L^c) and of Scot., Guil. and Trap.

At 636a6 after ἀλλ' of καὶ Ald. Bas. insert 636b33-637b15 δι' ἀλλας . . . ἀπερι. This transposition does not occur in any extant Greek MS nor in Scot. Guil. In Lc Ambros. there is a mark at 636a6 after of καὶ and again at 637b15 after ἀπερι. (Q has marks in the margin at both places; R^a has marks in the margin at 636a6, not copied by Xc.) The result is that Ald. Bas. read ἀπερι δι' at 637b15 (both omit ? and ἀυτῇ) which is evidently a mistake: the transposition should have been made after δι' at 636a6, but the mark has been placed wrongly in Lc, which was the model for the Aldine printer's copy. Bekker, who based his text primarily upon the Basel 1550 edition, restored the MSS order including ? δι' in its correct place at 636a6, but omitted to remove δι' from 637b15. This mistake has led to attempts by some edd. to interpret 637b15 as a reference to homosexuality. The mistake was in fact already corrected in the version translated by Fel., which follows the Aldine transposition except that it restores δι' at 636a6 and omits δι' at 637b15. Sylburg and Casaubon however repeated the mistake, and it is again found in Scaliger's posthumous edition of 1619 which prints Sylburg's Greek text, though Scaliger's translation both in 1584 and in 1619 omits δι' in both places. Scaliger further re-orders the text as follows: 636a6 of καὶ is followed by 636b33-637b6, 636a6-8, 636b23-32, 636a9-b23, 637b6 . . . Schneider (followed by Cresswell's translation) re-orders again as follows: 636a6-8 as in the MSS including δι' in its original place, then 636b23-637b6, 636a9-b23, 637b6 . . .

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On 636b10

The MSS and Guil. read "will *not* have children". That could follow the previous clause if 636b8 ἢ is interpreted as ἢ ἂν ("or if both are able . . ."), but it would make 636b7 ἀν μὴ . . . ἀτεκνίας impossible to fit into the argument. Scot. did not read the negative, and Alb.'s paraphrase omits it. Bk. Buss. Dt. seclude it, but Ald. and early edd. keep it; Louis keeps it but drastically alters the previous clauses, as is necessary if οὐκ is read. Louis's note however overstates the conflict between HA X here and GA on the 'symmetry' that is necessary between the male and female contributions. For in GA Arist. argues that the menses which are the female seed (cf. 634b29 note) must be 'symmetrical' or proportionate to the male seed (cf. GA I 723a29, 727b11, 729a17, IV 767a16, 772a17), and he says at IV 767a24 that for this reason a change of partners may be beneficial (cf. HA IX(VII) 585b8). The difference between HA X and GA on this point is that, whereas X 636b13 bases 'symmetry' upon equal speed of emission, GA rejects this and bases it upon proportionate heat and quantity.

APPENDIX

Weights and measures used in *Hist. An.*

Length:

4 finger-breadths (δάκτυλοι)	= 1 palm (παλαιστή)
12 "	= 1 span (σπιθαμή)
16 "	= 1 foot (πούς)
24 "	= 1 cubit (πῆχυς)
96 "	= 1 rod (ὀργυιά)
1600 "	= 1 plethron
9600 "	= 1 stadion

Capacity:

6 ladles (κύαθοι) = 1 cup (κοτύλη), varying from .2 to .3 litre

liquid: 6 kotylae = 1 maris

12 kotylae = 1 pitcher (χοῦς)

144 kotylae = 1 metretes (approx. 8½ gallons, 39 litres)

dry: 192 kotylae = 1 Attic medimnus

(approx. 1½ bushels, 52 litres)

Weight:

1 Attic talent (= 60 minae = 6000 drachmae)

= approx. 58 lbs, 26 kilograms

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This Index is to the three volumes of translation only and not to the introductions or notes. Where Balme's renderings differ from Peck's, Balme's have almost always been followed; alternative renderings and spellings used in these volumes are given in parentheses, and are cross-referenced. Passages are usually cited by their opening Bekker line number alone. The citations are in numerical order, although those from book IX(VII), 581a9-588a12, will be found in the text between 633b8 (the end of VIII(IX)) and 633b12 (the beginning of X).

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